THE IRON TRADE REVIEW

Volume XLVIII CLEVELAND, APRIL 13, 1911 Number 15

Demand for Iron and Steel Products Declines

Prices of Black and Galvanized Sheets and Structural Shapes Reaffirmed—Harriman Rail Order Placed—Ore Prices Not Yet Fixed

All centers report a decline in demand for finished materials and with the exception of wire products and tin plate, specifications are not as heavy as in March. Pig iron is dull, and notwithstanding the low prices that are being named, consumers are not inclined to cover for extended deliveries. Shading in prices has been reported on open-hearth billets and sheet bars, and in the west a contract for plates was closed at a concession of $2 a ton. At a meeting of manufacturers of black and galvanized sheets, held in Pittsburg, Tuesday, prevailing prices were reaffirmed. It developed that quotations had been shaded slightly, particularly by jobbers, who made favorable contracts last fall. At present the sheet mills are operating at from 50 to 70 per cent of capacity. At a recent meeting of manufacturers of structural shapes, it developed that prices were being firmly maintained, although heavy concessions are being made in fabricating costs.

Iron Ore

The iron ore situation, especially as regards prices, is slow in crystallizing this year. While no general meeting has been held, the subject was informally discussed by a few of the operators in Cleveland during the present week. No more than an interchange of opinion, however, was developed, and April may pass without any definite understanding being reached. It does not look now as if any ore will be moved in April, and speaking broadly, no ore sales at all have been made. Of course some verbal reservations exist, but in the aggregate, they constitute a comparatively small tonnage. Apparently the Steel Corporation's ore piles are abundant, as the Pittsburg Steamship Co. does not intend to make a general start until May, and moreover, expects to move all its ore in its own ships. It has vessel capacity to move 15,000,000 tons. Last year it moved a total of 22,000,000 tons. If the largest shippers expect to move only 75 per cent of last year's movement, as is commonly reported, the Steel Corporation will practically carry all of its ore in its own ships. What influence this may have upon the freight rate remains to be seen, but no disposition is as yet shown to cut the rate. On the whole, the situation is not too promising for either the independent mine operator or independent vessel owner. Recent developments would indicate that independent interests might not be unwilling to shade ore prices slightly if business could be stimulated thereby.

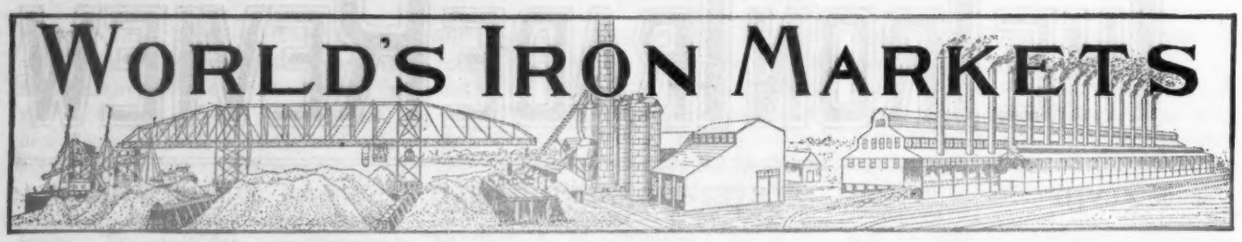
Steel Corporation Tonnage

The United States Steel Corporation reported unfilled orders on hand on March 31, amounting to 3,447,301 tons, an increase of 46,758 tons during the month. The rate of increase during March was 1.37 per cent, as against 9.31 per cent in February, and 16.30 per cent in January. This decline in the percentage of increase of unfilled orders is due both to a less active rate of new bookings and to an increased shipping movement. New orders in March aggregated 35,000 tons daily, as compared with 40,775 tons in February. Shipments during March were about 79 per cent of the maximum output, and bookings were at the rate of about 83 per cent. As the mills were operating at from 70 to 75 per cent of their capacity in March, it is evident that considerable finished tonnage was shipped from stock.

Rails and Structural Material

The Harriman system has finally placed its initial order of 72,000 tons of rails. The tonnage has been divided as follows: The Colorado Fuel & Iron Co., 33,000 tons of open-hearth rails; Illinois Steel Co., 21,225 tons of Bessemer rails and the Tennessee Coal, Iron & Railroad Co., 18,000 tons of open-hearth rails. The Pennsylvania Steel Co. has taken 2,000 tons of girder rails for the Brooklyn Rapid Transit Co., and 500 tons for Denver street railways. The Richmond, Fredericksburg & Potomac railroad has placed an order with the Maryland Steel Co. for 1,000 tons of rails, and the Illinois Steel Co. has been awarded a total of 3,300 tons of rails during the week, including one lot of 2,500 tons. The Boston Elevated has placed 1,200 tons of open-hearth rails with the Bethlehem Steel Co., and 600 tons of Bessemer sections with the Pennsylvania Steel Co. All districts report numerous small structural lettings. The Phoenix Bridge Co. has taken 1,000 tons for the Central of New Jersey car shops, and the American Bridge Co., 400 tons for a building at Portland, Me. An insurance building in New York will require 8,000 tons, and a large hotel project in Pittsburg, under consideration, involves 20,000 tons. The McClintic-Marshall Construction Co. has taken a contract for the new machine shop of the International Harvester Co., Milwaukee, amounting to 1,500 tons.

WORLD'S IRON MARKETS



PITTSBURG

Sheet Manufacturers Meet—Pig Iron Dull.

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg., Apr. 11.

Developments in the iron and steel trade during the week have not been encouraging. New business is extremely light and the falling off in specifications against contracts has resulted in production being curtailed. Buyers are showing little interest in the situation and the railroads are limiting orders to cover actual needs. Reports of price concessions on open-hearth steel, noted last week, have been confirmed by actual sales, including 250 tons of open-hearth sheet bars to a nearby consumer at $24, delivered, the freight rate being 50 cents, and 200 tons of open-hearth billets to an Ohio consumer having a higher freight at slightly under $23, delivered. Bessemer billets and sheet bars are firm and there is no evidence of $23 and $24, respectively, f. o. b. makers' mill, Pittsburg or Youngstown, having been shaded. A western mill has also shaded the price of plates $1 a ton. There has been some irregularity in prices on sheets during the past 10 days. Sheet manufacturers are meeting at the Fort Pitt hotel this afternoon to discuss trade conditions. Demand for wire products continues heavy and some mills are three and four weeks behind in shipments. Local mills have received specifications against contracts for tin plate for April and May delivery and specifications for June delivery are due April 15.

The Cambria Steel Co. has taken a contract for upward of 4,000 tons of car material for the Altoona shops of the Pennsylvania railroad, and the Carnegie Steel Co. has received a contact for about 3,000 tons of plates for the St. Ignace (Mich.) car ferry to be built by the Toledo Ship Building Co. No action has been taken on inquiries for freight cars noted recently. The structural market is dull and some extremely low prices have been quoted by fabricators.

The past week has been the dullest in several months as far as the local pig iron market is concerned. There is not a live inquiry pending. Consumers are showing no interest in the market and the question of prices apparently has little to do with the situation. The coke market is dull, but prices show little, if any, change. Further reductions in prices of scrap are noted. Heavy melting steel has sold at $13, delivered, Pittsburg, the lowest price at which this material has sold for a long time. Shipments are being cut down and the embargo against shipments of heavy melting steel to Monessen is still in force.

Pig Iron.—The past week has been the dullest in several months as far as the local pig iron market is concerned. Prices have not suffered to any extent, as the question of prices apparently has little to do with the situation. Consumers are showing no interest in the market and will not buy very far ahead. Consumption continues heavy and stocks in the hands of consumers are considerably lower than a month ago, while stocks at furnace yards are gradually increasing. There is not a live inquiry in the market at present. A few foundry interests have asked for prices on foundry grades for delivery over the last half of the year, but these were evidently put out for the purpose of testing the market, as bids have been submitted and consumers are not showing a disposition to close.

Furnace interests will not quote below $15, valley, on Bessemer for prompt or forward delivery and no sales have been reported in this market. Basic is still quotable at $13.75, valley, but there is little inquiry pending. Investigation shows that a few consumers of basic and Bessemer iron will be obliged to enter the market within the next few weeks, or curtail operations. Sales of No. 2 foundry iron include one lot for 250 tons and another lot of 100 tons for early shipment at $14.90, delivered, Pittsburg. All sellers are quoting $14.25, valley, on this grade for delivery beyond July 1. Demand for malleable and gray forge is extremely light and no important sales have been made.

It is likely that the next ten days will witness some important changes in blast furnace operations on the part of merchant and non-merchant furnace interests. In view of the fact that the market has not been thoroughly tested, we continue to quote prices as follows:

(Prompt Shipment.)

Bessemer, valley	$15.00
Bessemer, Pittsburg	15.90
Basic, valley	13.75
Basic, Pittsburg	14.65
No. 2 foundry, Pittsburg	14.65
Gray forge, Pittsburg	14.15
Malleable, Pittsburg	14.65

(Second Quarter.)

Bessemer, valley	$15.00
Bessemer, Pittsburg	15.90
Basic, valley	13.75
Basic, Pittsburg	14.65
No. 2 foundry, Pittsburg	14.90
Gray forge, Pittsburg	14.15
Malleable, Pittsburg	14.65

Ferro-Alloys.—Local consumers of ferro-alloys are taking advantage of the low prices quoted by some sellers and have covered for their requirements over the remainder of the year. A steel company, with offices in Pittsburg and works west of this city, has taken about 1,000 tons of ferro-manganese for delivery up to Oct. 1 at about $36.50, Baltimore, this being the lowest price at which this material has sold in this market for a long time. An Ohio consumer is in the market for 100 tons of ferro-manganese and scattered inquiries for one car each are noted. Inquiry for ferro-silicon is light and prices are not very firm.

We quote ferro-manganese at $36.50 to $37, Baltimore, for prompt and forward delivery. The freight rate from Baltimore to Pittsburg is $1.95 per ton.

Fifty per cent ferro-silicon is quoted at $53 to $54, Pittsburg, for prompt and forward delivery; 12 per cent, $25; 11 per cent, $24; 10 per cent, $23, f. o. b. Jisco and Ashland furnaces. The freight rate to Pittsburg is $1.90. The foreign grades are held at $1 or more a ton over domestic prices.

Plates.—New business and specifications against contracts for plates so far this month have been light and some of the small mills in western territory are shading 1.40c, Pittsburg, a few small lots of plates having been sold at 1.35c, Pittsburg. All local mills continue to quote 1.40c, Pittsburg. The Cambria Steel Co., Johnstown, Pa., has been awarded the contract for slightly over 4,000 tons of car material for the Al-

toona, Pa., shops of the Pennsylvania railroad. The Carnegie Steel Co. has taken a contract for between 2,500 and 3,000 tons of plate for the St. Ignace (Mich.) car ferry, for which the Toledo Ship Building Co. has the general contract. No important awards for cars have been placed in this market during the week. Inquiries under active negotiation include 1,000 steel coke cars and 1,000 steel gondola cars for the Pittsburg & Lake Erie, and 1,000 gondolas and 500 refrigerator cars for the Burlington system. Local car shops are running light and have very little business on the books. We quote the market as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches, 1.40c. Extras are as follows, per 100 pounds: Boiler and flange steel plates, 0.10c; A. B. M. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.20c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½ inch to and including 3-16 inch plate on thin edge, 0.10c; under 3-16 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Sheets.—A well attended meeting of sheet manufacturers opened at the Fort Pitt hotel, at 1 o'clock this afternoon and was still in session late this afternoon. Practically all mills are represented. The meeting was called by James A. Campbell, president of the Youngstown Sheet & Tube Co., who is chairman of the sheet and tin plate branch of the American Iron and Steel Institute. Conditions surrounding the sheet market have not been satisfactory so far this year and evidence of price concessions on galvanized, black and blue anneal sheets has appeared during the past week or so. Reports this week indicate that the consuming trade is specifying more liberally against contracts. Jobbers report that stocks are gradually being reduced, but there has been little buying from this source. The Allegheny Steel Co. this week started additional sheet mills at its Brackenridge, Pa., plant and is running its 14 sheet mills practically full time. We quote prices as follows, with $1 a ton added as the delivered price in the Pittsburg district:

Blue annealed sheets, No. 10 gage, 1.65c; box annealed sheets, No. 28 gage, 2.20c; galvanized sheets, No. 28 gage, 3.20c; painted roofing sheets, 1.55c per square for No. 28 gage, 2½-inch corrugation; galvanized roofing sheets, 2.75c per square for No. 28 gage, 2½-inch corrugation.

Tin Plate.—This market is not as active as a month ago as far as new business is concerned, although specifications are heavy and mills are operating practically full time. Practically all consumers have specified against contracts for April and May delivery and June specifications are due on April 15. Some of the independent mills have booked considerable tonnage for fourth quarter delivery on a basis of $3.80, Pittsburg, for 14 x 20 100-pound cokes, which represents an advance of 10 cents per base box. During the past week, however, one independent company is known to have taken some business for fourth quarter delivery at today's price, $3.70 Pittsburg. There is every indication that April shipments of tin plate will be fully as heavy as in March. The base price on tin plate is as follows:

Coke tin plate, 10-pound basis, 14 x 20, $3.70 f. o. b. mill, Pittsburg district.

Rails and Track Material.—Manufacturers of standard steel rails state that in all cases the railroads are accepting shipments against contracts in accordance with the schedule arranged when the contracts were made early in the year. Domestic business in standard steel rails is comparatively light, although two or three orders for 500 tons each have been booked in this market during the week. New business in light rails is heavy for this season of the year, orders during the past week aggregating several thousand tons. Buying of spikes and track bolts has been only moderately heavy since April 1, when all local mills advanced prices to $1.60, Pittsburg. We quote the market as follows, the base price on open-hearth rails being 1.34c per pound at the mill.

Fifty-pound and heavier, 1.25c per pound; carloads and less than 500 tons, 1.34c per pound; light rails on base weight of 40 to 45 pounds, $26.50 to $27, the schedule on the other weights being irregular and subject to negotiations; angle splice bars for standard sections, 1.50c, Pittsburg; track bolts, 2.30c, Pittsburg.

RAILROAD SPIKES.

4½, 5 and 5½ x ⅜	$1.60
3, 3½, 4, 4½ and 5 x ½	.10
3½, 4 and 4½ x ⅝	.20
3, 3½, 4 and 4½ x ⅝	.30
2½ x ⅝	.40
2½, 3 and 3½ x ⅝	.60
2 x ⅝	.80

BOAT SPIKES.

¾-inch square, 12 to 24-inch. long	$0.15
⅝-inch square, 8 to 16-inch. long	.15
½-inch square, 6 to 16-inch. long	.15
⅜-inch square, 6 to 12-inch. long	.20
⅜-inch square, 4 to 12-inch long	.30
⅜-inch square, 4 to 8-inch. long	.45
¼-inch square, 4 to 8-inch. long	.75
¼-inch square, 3 to 3½-inch. long	1.00

⅜ and ⅝ shorter than 4 inches, ¼ cent extra.

Steel.—Reports of price concessions on open-hearth billets and sheet bars, noted last week, have been confirmed by actual sales. A nearby consumer bought 250 tons of sheet bars at $24, delivered. The freight rate is 50 cents, which means that the market has been shaded 50 cents a ton. An Ohio consumer having a higher freight rate has taken 200 tons of open-hearth billets at slightly under $23, delivered. The larger mills, however, continue to quote $23 and $24, respectively, f. o. b., makers' mill, Pittsburg or Youngstown. The market on Bessemer billets and sheet bars is firm and there is no evidence of shading. The semi-finished steel market, as a whole, is not as active as a month ago and mill operations have been reduced somewhat. The leading interest has discontinued rolling sheet bars at the old No. 2 rail mill at the Edgar Thomson plant. A small lot of forging steel has been sold at a premium of $1 a ton. We quote the market as follows:

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $23, with the usual extras for size and analysis, and open-hearth rolling billets, $23. Bessemer sheet and tin bars are quoted at $24, and open-hearth sheet bars are quoted at $24, makers' mill, Pittsburg or Youngstown, with full freight to destination added. Forging billets are quoted at $28 to $28.50, Pittsburg.

Hoops and Bands.—Specifications against contracts for hoops and bands continue to come in at about the same rate as in March, although new business is comparatively light, users confining purchases to cover actual needs. Practically all mills are now quoting 1.45c, Pittsburg, on hoops for early shipment, and 1.50c for third quarter delivery. We quote the market as follows:

Hoops in carload lots, 1.45c for prompt delivery and 1.50c for forward delivery; in less than carload lots, 1.60c; bands, 1.40c, base, with net extras, as per standard steel.

Merchant Bars.—Orders for steel bars so far this month have not been very heavy as users will not buy very far ahead. On the other hand, manufacturers are not forcing sales by offering price concessions, and the market continues firm at 1.40c, Pittsburg. Some disappointment is shown on account of the delay on the part of western farm implement manufacturers in covering for their requirements over the year beginning July 1. The bar iron market continues extremely quiet, as the railroads and other users show little interest in the situation. The demand for shafting is only moderately heavy. We quote the market as follows:

Common iron bars, 1.35c to 1.40c, Pittsburg; Bessemer and open-hearth steel bars, 1.40c; plow and cultivator, 1.40c; channels, angles, zees, tees, under 3-inch, 1.50c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds of a size, 0.35c advance. Cold rolled and ground shafting, 55 per cent in carloads and 50 per cent in less than carloads, delivered in base territory.

Muck Bar.—Aside from a few scattering sales of muck bar at from $29.50

to $30, Pittsburg, this market is showing little life. We quote the best grades of muck bar at from $29.50 to $30, Pittsburg.

Structural. — Comparatively little structural work is appearing in the immediate Pittsburg districts. Present indications are that work on the proposed new office building, a hotel, and two bridges, involving in the neighborhood of 20,000 tons of structural steel, will be held up until sometime during the third quarter. The McClintic-Marshall Construction Co., Pittsburg, has been awarded the contract for the new machine shop of the International Harvester Co., Milwaukee, involving 1,500 tons of structural steel. The proposed new buildings for Spang, Chalfant & Co., Inc., and the Union Steel Casting Co., Pittsburg, will involve in the neighborhood of 1,000 tons of steel, but no awards have been made. Some extremely low prices have been quoted by fabricators, but all local steel mills continue to ask 1.40c Pittsburg on steel. Reports of price concessions have not been confirmed. We quote the market as follows:

Beams and channels, 15 inches and under, 1.40c; over 15 inches, 1.50c; zees, 1.40s; tees, 1.45c; angles, from 3 to 6 inches, 1.40c; over 6 inches, 1.50c; universal and sheared plates, 6¼ inches wide and wider, 1.40c.

Merchant Pipe.—The total tonnage of pipe involved in miscellaneous business placed during the week is moderately heavy, although inquiries, which call for heavy tonnage of line pipe, noted in this market recently, have not been acted upon. A western interest has placed an order for 10 miles of 6-inch gas line pipe for delivery in Kansas, with an independent mill. Bids have gone in on three or four inquiries involving from 40 miles to 70 miles of from 6 to 12-inch line pipe. Some large users of line pipe are expecting to enter the market within the next few months and the outlook is more promising. Notwithstanding that stocks in the hands of jobbers are low, very little business is coming from this source. We quote the following official discount in carload lots, subject to the usual preferential discount to the larger buyers, merchant pipe, where specified, being offered in from ⅛ to 6 inches.

Iron and Steel Pipe Basing Prices.

	Steel.		Iron.	
	Butt weld.			
	Black.	Galv.	Black.	Galv.
⅛, ¼, ⅜ inch.....	72	58	68	54
½ inch	75	63	71	59
¾ to 1½ inch	79	69	75	65
2 to 3 inches.....	80	70	76	66
	Lap weld.			
2 inches	76	66	72	62
2½ to 4 inches.....	78	68	74	64
4½ to 6 nches.....	77	67	73	63
7 to 12 inches.....	75	59	71	55
EXTRA STRONG, PLAIN ENDS.				
	Butt weld.			
⅛, ¼, ⅜ inch	69	59	65	55
½ inch	74	68	70	64
¾ to 1½ inch	78	72	74	68
2 to 3 inches	79	73	75	69
EXTRA STRONG, PLAIN ENDS.				
	Lap weld.			
2 inches	75	69	71	65
2½ to 4 inches	77	71	73	67
4½ to 6 inches.....	76	70	72	66
7 to 8 inches	69	59	65	55
9 to 12 inches.....	64	54	60	50
DOUBLE EXTRA STRONG, PLAIN ENDS.				
	Butt weld.			
½ inch	64	58	60	54
¾ to 1½ inch	67	61	63	57
2 to 3 inches	69	63	65	59
DOUBLE EXTRA STRONG, PLAIN ENDS.				
	Lap weld.			
2 inches	65	59	61	55
2½ to 4 inches.....	67	61	63	57
4½ to 6 inches.....	66	60	62	56
7 to 8 inches	59	49	55	45

Plugged and reamed pipe is furnished at 2 points higher price, either butt or lap weld.

Boiler Tubes.—There is little activity in this market. Users continue to specify rather freely against contracts, but buying is very light and there is evidence of irregularity in prices. We quote the market as follows:

	Steel.	Iron.
1 to 1½ inch	49	43
1¾ to 2¼ inch.....	61	43
2½ inch	63	48
2½ to 5 inch	69	55
6 to 13 inch	60	43

2½ inch and smaller, over 18 feet, 10 per cent net extra.

2¾ inch and larger, over 22 feet, 10 per cent net extra.

To destination east of the Mississippi river will be sold at delivered discount for carloads lowered by two points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburg.

Wire Products.—This market is by far the most active branch of the local iron and steel trade. Consumers are specifying very liberally and some mills are running from three to four weeks behind in shipments. All mills are maintaining quotations of $1.80, Pittsburg, on wire nails, and $1.60, Pittsburg, on plain wire, although it is understood that in a few instances jobbers who are covered under the old card, which is $1 a ton under today's market, are offering slight concessions to users. The Cambria Steel Co., Johnstown, Pa., has booked considerable business for its new wire mills, which will be started next week. We quote the market as follows:

Wire nails, jobbers' carload lots, $1.80; retailers' carload lots, $1.85; cut nails (western makers), jobbers' carload lots, $1.65; cut nails (eastern makers), Pittsburg base, $1.70; painted barb wire, jobbers' carload lots, $1.80; retailers' carload lots, $1.90, with 30c for galvanizing; plain wire to jobbers in carloads, $1.60, and to dealers, in carloads, $1.65; polished staples, $1.80; galvanized staples, $2.10.

Wire Rods.—There is little new business appearing in this market, as all large users are covered by contract. Shipments so far this month are equal to those of the corresponding period in March. The general asking price on wire rods is $30, Pittsburg, although this price has been shaded considerably. We quote from $29 to $30, Pittsburg, for Bessemer and open-hearth wire rods.

Coke.—The coke market is practically at a standstill as far as new business is concerned, although there is little change in the price situation. Most of the larger consumers of furnace coke are covered by contract, and those who have been buying in the open market from month to month are covered to May 1. Aside from a few small tonnages under negotiation, no inquiries have appeared. Shipments are heavy, as blast furnace operations have not been reduced. Confidence in the future is not entirely destroyed; production and shipments are within 77 per cent of practical capacity of the Connellsville region. We quote Connellsville furnace coke for prompt shipment at from $1.55 to $1.65, ovens, and for second half at from $1.80 to $2, ovens. On high-grade Connellsville foundry coke we quote $2, ovens, for prompt shipment, and from $2.20 to $2.40, ovens, for forward delivery. The Connellsville *Courier's* figures for the week ending April 1 show 28,385 active ovens with an output of 368,029 tons, as compared with 28,337 active ovens and a production of 371,255 tons the previous week.

Old Material.—The scrap market is extremely weak. Trading is only for small lots and users have been able to pick up odd lots at bargain prices. Heavy melting steel has been sold as low as $13, delivered, Pittsburg, which is the lowest price at which this material has sold for a long time. Users, who are covered by contract, have cut down shipments materially, and the embargo against shipments of heavy melting steel to the principal consuming interest at Monessen, Pa., declared about April 1, is still in force. The Pennsylvania Lines West of Pittsburg, during the week, sold about 4,000 tons of miscellaneous scrap and bids close today on Pennsylvania Railroad Co.'s list, which includes between 15,000 and 18,000 tons. The indications are that the bulk of this tonnage will go direct to consumers, as dealers are not inclined to increase their holdings even at the low prices quoted by some producers of scrap. Bundled sheet scrap has sold in small lots at from $10.50 to $11. Iron axles have sold at $23.50, a reduction of 50 cents per ton. We quote, gross tons, delivered in the Pittsburg district, including Monessen, Sharon, Steubenville, Brackenridge and Follansbee, as follows:

Heavy melting scrap	$13.00 to 13.50
Rerolling rails	14.00 to 14.50
Bundled sheet scrap	10.50 to 11.00
Iron axles	23.50 to 24.00
Old iron rails	15.50 to 16.00
No. 1 wrought scrap	14.00 to 14.50
Old car wheels	13.50 to 14.00
Low phosphorus	17.00 to 17.50
Machine shop turnings	9.25 to 9.75
Cast borings	8.50 to 9.00
No. 1 cast scrap	13.50 to 14.00
Malleable	13.00 to 13.50
Stove plate	11.00 to 11.50

The Perkins Horse Shoe Co. has declared the regular quarterly dividend of 1 per cent on preferred stock, payable April 15.

CHICAGO

Pig Iron Market is Exceptionally Dull —Shading on Plates.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, Apr. 11.

The iron and steel market in the west is moving along easily and presents few features of interest. Railroad buying is still conspicuous by its absence. The latest excuse advanced by the transportation interests for not purchasing freely is that they do not care to add to their expenses until the close of the fiscal year, which will occur June 30. Until that time, it is announced, railroad purchases will be held down as much as possible.

The Chicago pig iron market is exceptionally dull. Southern iron seems well established on a basis of $11 for the balance of the year, while $15, Chicago furnace, can be done on northern iron through the third quarter. Re-rolled hard steel bars have been cut to 1.30c, Chicago, with only fair business at this figure. Structural awards reported in the Chicago market last week total 4,000 tons. The Colorado Fuel & Iron Co. and the Illinois Steel Co. will probably get a good share of the Harriman rail order, but formal contracts have not been placed. Plate business is fair, but there has recently been a renewal of price cutting and some mills are quoting 1.35c, Pittsburg, on narrow plates. Cast iron pipe business continues to hold up very well. The sheet trade is dull and the wire business increasingly active.

Pig Iron.—The week past was unusually dull and sales have been made in 50 and 100-ton lots. A report was circulated in the market that a Milwaukee malleable foundry had purchased 9,000 tons of malleable for second half shipment, but this is denied and in explanation it is stated that the report is a revival of an old sale which was made six weeks ago. One Chicago interest which usually handles a large tonnage sold only 100 tons last week. Southern iron seems well established on a basis of $11, Birmingham, for the balance of the year, although several furnaces are not in the market at this figure. Northern iron is steady at $15, Chicago furnace, which price can be obtained through the second and third quarters, although most northern furnaces are somewhat reluctant to quote beyond the first half, except at an advance of $1 a ton. Buyers, however, will not consider an advance in price at the present time. Some northern furnaces are preparing to blow out since it is claimed that money will be lost at present prices. Heretofore the producers have had a large number of high priced orders on their books which have enabled them to show a profit every month in spite of low market prices, but these have been practically all worked off and nearly all business is now on the basis of current quotations. Inquiry is light. A Chicago foundry is in the market for 1,000 tons for immediate delivery, 500 tons foundry iron and 500 tons high silicon.

The following prices represent the market for Chicago delivery, except northern iron, which is quoted f. o. b. furnace:

(Prompt shipment and first half.)

Lake Superior charcoal	$17.50
Northern foundry No. 2	15.00
Southern foundry No. 2	15.35
Southern silveries, 5 per cent silicon	16.35
Jackson Co. silveries, 8 per cent	18.90
Malleable Bessemer	15.00
Alabama basic	15.35

Billets.—There are no features of interest in the local billet market, and no sales of consequence have been made for the past ten days. We quote, open-hearth forging billets, $30.60, f. o. b. Chicago; open-hearth re-rolling billets, $25.60, base Chicago.

Merchant Bars.—Bar iron is quiet and the price is a little soft. Although makers received fairly heavy specifications during the early part of last week, business fell off on Thursday, Friday and Saturday and the net result of the week's operations shows very little change in the situation. Competition is keen in the market for re-rolled hard steel bars, and the price has again been cut $1 a ton to 1.30c, Chicago, with only fair business at this figure. Soft steel bars are quiet. Business in shafting is fair.

We quote, Chicago delivery, as follows:

Bar iron, 1.25c to 1.30c; hard steel bars, rerolled, 1.30c to 1.35c; soft steel bars and bands and small shapes, 1.58c to 1.63c, base; hoops, 1.68c to 1.73c; planished or smooth finished tire steel, 1.78c to 1.83c, base; iron finished tire steel, 1.73c, base; smooth finished machinery steel, 1 inch and larger, 1.98c; spring steel, 2.28c; crucible spring steel, 2.78c; tool steel, 7c to 9c, with higher prices for special grades. Quotations on shafting are 57 per cent off the list for carload lots, and 52 per cent off for less than carload lots, carload freight allowed to points in base territory.

On iron and steel from local stock, we quote as follows:

Bar iron, 1.80c to 1.90c per pound base; soft steel bars, 1.80c to 1.90c per pound base; soft steel hoops, 2.10c to 2.20c, full extras.

Structural Steel.—A period of quiet is in evidence in the structural steel market in the west, the fabricating business being particularly dull just at this time. The mills are receiving only moderate orders for plain material and are operating under fair schedules. Warehouse business in structural material is comparatively light. The Gunther building, Chicago, 2,500 tons, will be fabricated by the Morava Construction Co.; Bethlehem shapes will be used. The McClintic-Marshall Construction Co. has been awarded a contract for fabricating the steel in the new machine shop at the International Harvester Co.'s Milwaukee works, for which 1,500 tons will be required. Business in the far west is reported quiet.

We quote, structural material, f. o. b. Chicago, as follows:

Beams and channels, 15 inches and under, 1.58c to 1.63c. For extras, see Pittsburg report.

Plain material, out of store, is as follows:

All angles, 3 inches and larger, including 6 inches, $1.80 to $1.90 per 100 pounds; angles over 6 inches, $1.90 to $2 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $1.80 per 100 pounds, base; channels, 3 inches and larger, $1.80 per 100 pounds, base.

Rails and Track Supplies.—Business in standard rails was very light last week. It is understood that western interests, including the Colorado Fuel & Iron Co. and the Illinois Steel Co., will get a large share of the Harriman rail order, but formal contracts have not yet been placed. The 72,000 tons of rails which it is reported the Harriman lines have decided to buy will be used in maintenance work and an additional tonnage will be required for the double tracking which was announced some time ago. Specifications against contracts for track supplies are excellent and new orders are fair. Local track supply mills are operating at full capacity.

For prices on standard sections see Pittsburg report. We quote, light rails, f. o. b. Chicago, and track supplies, f. o. b. Joliet, as follows:

Light rails, carloads, 40 to 45-pound, 1.16c to 1.20½c; 30 to 35-pound, 1.19½c to 1.24c; 16, 20 and 25-pound, 1.20½c to 1.25c; 12-pound, 1.25c to 1.29½c.

Light section relayers, 45 pounds and under, subject to inspection, $21 to $23; standard section relaying rails, subject to inspection, $23.50 to $24.

Track supplies, f. o. b. Joliet, angle bars, 1.50c to 1.60c; railroad spikes, 1.65c to 1.75c; smaller size spikes, 1.70c, base; track bolts with square nuts, 2.15c to 2.25c, base.

Plates.—Plate business is fair. There has recently been a renewal of the price shading which characterized the local market during the latter part of 1910 and some mills rolling comparatively narrow plates are quoting on a basis of 1.35c, Pittsburg, although this is not a sufficiently wide movement to materially affect general market conditions. The car inquiries of the Chicago, Burlington & Quincy and Pittsburg & Lake Erie, which were reported last week, are still pending.

We quote, mill prices, f. o. b. Chicago, as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches wide, 1.58c to 1.63c. For extras, see Pittsburg report.

Store prices are as follows:

Tank steel, ¼ inch and heavier, up to 72 inches wide, 1.80c to 1.90c; from 72 inches to 96 inches wide, 1.90c to 2c; 3-16 inch up to and including 60 inches wide, 1.90c to 2c; 72 inches, 2.15c to 2.25c; No. 8, up to 60 inches wide, 1.95c to 2.05c. Flange quality and heads, 25c extra.

Sheets.—Sheet business is fair and the local mill continues to run at about the same rate as it has for the past 60 days. The mills are operating, however, with only a few days' orders ahead and this makes the producers somewhat nervous, although new business is coming in steadily and in sufficient quantities to maintain operations on a fairly satisfactory basis. There seems to be no evidence of price cutting in this territory.

We quote, store prices, f. o. b Chicago, as follows:

Blue annealed, No. 10, 2.10c to 2.20c; No. 12, 2.15c to 2.25c. Box annealed, No. 28, 2.75c to 2.85c. Galvanized, No. 28, 3.65c to 3.75c.

For mill prices, see Pittsburg report. Freight to Chicago, 18 cents.

Wire Products.—With the advance of spring the demand for wire, particularly from agricultural sections, continues very heavy. Inquiry among hardware dealers located throughout the west indicates that if the crops are at all satisfactory, the fall business that will be enjoyed by the wire makers will be even larger than that which is being taken at the present time.

We quote, f. o. b. Chicago, as follows:

Wire nails, jobbers' carload lots, $1.98; retailers' carload lots, $2.03; retailers' less than carload lots, $2.13; painted barb wire, jobbers' carload lots, $1.98; retailers' carload lots, $2.03; retailers', less than carload lots, $2.13; with 30c for galvanizing; plain wire to jobbers, $1.78; plain wire, retailers carload lots, $1.83; staples, bright, $1.98.

Merchant Pipe and Tubes.—There has not been much change in the demand for tubes out of store since the price reduction a week ago, although orders are a trifle heavier. This may be due to natural conditions however, rather than to the change in price. Boiler makers are running light and the demand for boiler tubes is only moderate. With the opening of spring weather the consumption of merchant pipe is increasing to some extent.

We quote, iron and steel pipe and tubes, out of store, as follows:

Iron and Steel Pipe Basing Prices.

	Steel. Black.	Steel. Galv.	Iron. Black.	Iron. Galv.
⅛-⅜ inch	69.2	54.2	63.2	48.2
½ inch	72.2	59.2	66.2	53.2
2 in. to 3 in.	77.2	66.2	72.2	61.2
4½-6 inches	74.2	63.2	69.2	58.2
7-12 inches	71..2	54.2	67.2	50.2
EXTRA STRONG, PLAIN ENDS.				
½ inch	70.2	63.2	54.2	52.2
2-3 inches	75.2	68.2	61.2	55.2
7-8 inches	65.2	....	59.2	47.2
DOUBLE EXTRA STRONG.				
½ inch	58.2	50.2	....	....
2-3 inches	63.2	55.2	....	....
7-8 inches	53.2	41.2	....	....

Tubes.

	Lap weld steel. Per cent.	Charcoal iron. Per cent.	Shelby seamless. Per cent.
1 inch	39	..	57½
1¼ to 2¼ inch	55	40	35
2¾ to 3¼ inch	62½	50	46

Cast Iron Pipe.—The cast iron pipe business has not up to date been affected by the softening in the pig iron market and prices are being maintained, although there is evidence of weakness. Routine business is fair. The United States Cast Iron Pipe & Foundry Co. has taken a contract for 1,500 tons of water pipe to be delivered to the city of Elyria, O. The same interest recently shipped a solid train of 30 cars of water pipe to the Portland Gas & Coke Co., Portland, Ore. This was part of the shipment of 12,000 tons which was ordered some time ago.

We quote the market, f. o. b. Chicago, as follows:

Four-inch water pipe, $25; 6 to 12 inches, $24.50, larger sizes, $24; gas pipe, $1 a ton higher.

Old Material.—The Chicago scrap market is dull. Prices on old car wheels and old iron rails have been shaded 25 cents a ton, the former to $13 and the latter to $15, Chicago. The Chicago, Rock Island & Pacific is offering a small list amounting to 110 tons, on which bids will close April 13. Heavy melting steel and railroad wrought are weak. There is very little activity in the market at present and considerable irregularity in quotations is noted, which makes it difficult to arrive at true average figures.

We quote the market, for delivery in consumers' yards, f. o. b. Chicago, as follows:

GROSS TONS.	
Old car wheels	$13.00 to 13.50
Old iron rails	15.00 to 15.50
Rerolling rails (5 ft. and over)	13.00 to 13.50
Old steel rails (3 ft. and under)	12.25 to 12.75
Frogs, switches and guards	11.50 to 12.00
Heavy melting steel	11.50 to 12.00
Shoveling steel	11.00 to 11.50
NET TONS.	
No. 1 R. R. wrought	$11.50 to 12.00
No. 2 R. R. wrought	10.50 to 11.00
Arch bars and transoms	14.50 to 15.00
Knuckles, couplers and springs	11.25 to 11.75
Shafting	15.25 to 15.75
Iron car axles	18.75 to 19.25
Steel car axles	17.75 to 18.25
Locomotive tires	17.00 to 18.00
Dealers' forge	10.50 to 11.00
Pipes and flues	8.75 to 9.25
No. 1 cast	12.00 to 12.50
No. 1 busheling	9.50 to 10.00
No. 2 busheling	7.50 to 8.00
No. 1 boiler cut	8.75 to 9.25
Boiler punchings	13.50 to 14.00
Cast and mixed borings	5.75 to 6.25
Machine shop turnings	6.75 to 7.25
Railroad malleable	10.75 to 11.25
Agricultural malleable	10.25 to 10.75
Stove plate and light cast scrap	10.25 to 10.75
Angle bars, splices, etc., iron	12.75 to 13.50
Angle bars, steel	11.00 to 12.00

Cleveland Furnace Co. Offers By-Product Coke—No Action in Ore.

Office of THE IRON TRADE REVIEW,
Penton Building, Apr. 11.

Iron Ore.—Interviews with ore sellers and blast furnace operators have not resulted in convincing a majority that the time has arrived for opening the ore market for this year. Furnace operators when questioned are free to admit that even if a reduction of $1 a ton were made in ore prices, they would be undecided as to what purchases to make. The tonnage which will be required by furnaces before July 1 is very small, and many furnaces have enough ore on hand to run them to Oct. 1.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $5; Mesabi Bessemer, $4.75; old range non-Bessemer, $4.20; Mesabi non-Bessemer, $4.

Pig Iron.—The dullness which has characterized the market for several weeks continues, and no inquiries of importance are pending. Prices are unchanged. We quote, delivered in Cleveland, as follows, the lower quotations being for prompt delivery and the higher for last half:

No. 1 foundry	$14.75 to 15.25
No. 2 foundry	14.25 to 14.75
No. 2 southern	15.35 to 15.85
Gray forge	13.50 to 14.00
Bessemer	15.90
Lake Superior charcoal	17.50 to 18.00
Jackson Co. 8 per cent silvery	18.50 to 19.00

Coke.—The Cleveland Furnace Co. has begun the sale of Semet-Solvay coke at $4.15, delivered in Cleveland. The company reports that excellent results have been obtained by foundrymen who have been experimenting with this coke. Rogers, Brown & Co. are the selling agents. The coke market is very dull. We quote:

Connellsville furnace coke, $1.55 to $1.65 for prompt delivery, and $1.75 to $2 for second half. Connellsville foundry coke, $1.95 to $2 for prompt, and $2 to $2.50 for second half.

Finished materials.—The most important contract awarded this week was 2,500 tons of plates and shapes

to the Carnegie Steel Co. for a new car ferry to be built for the Mackinac Transportation Co., to operate between Mackinac City and St. Ignace. The car ferry, which will have a capacity of 25 cars, will be built by the Toledo Shipbuilding Co. The Carnegie Steel Co. has also taken a contract for 500 tons of sheet piling for the cofferdam for the Cherry street bridge, Maumee river, at Tolelo, to be built by C. H. Fath & Son, Cleveland. There are now no less than six hotel building projects pending in Cleveland, but none of them seems near the contract stage except the Statler hotel, and even concerning this no definite information is available as to when the contract will be placed. An inquiry for 5,000 car axle billets has been put out in this market. An agent for a large independent steel company reports that last week recorded the best business for the year for his office, but on the whole, the finished material market seems more quiet. This is particularly true of bar iron, and it is doubtful whether the Cleveland iron mills will be able to continue in operation unless business improves to a considerable extent. There is considerable cutting in prices of sheets and competition is keen.

Old Material.—Quiet has characterized the local and outside market the past week. While a slight concession has been made in the price of heavy steel, 25 cents a ton, this is only for spot material. Local dealers refuse to move their yard steel at this price and declare they will hold it throughout the summer rather than make further concessions. Mills in the city are running fairly well but are not buying further. In the district outside this city there is little demand even at some concessions. We quote, f. o. b. Cleveland, gross tons, as follows:

Old iron rails	$15.00 to 15.50
Old steel rails (under 6 ft.)	13.50 to 14.00
Old steel rails (over 6 ft.)	13.00 to 13.50
Old car wheels	12.50 to 13.00
Old steel boiler plate	10.00 to 10.50
Malleable iron (railroad)	12.75 to 13.25
Steel axles	19.00 to 19.50
Malleable iron (agricultural)	11.00 to 11.50
Heavy steel	12.75 to 13.25
Country mixed steel	10.50 to 11.00

We quote, net tons, as follows:

No. 1 R. R. wrought	$13.00 to 13.50
No. 1 busheling	11.00 to 11.50
No. 1 machine cast	12.00 to 12.50
No. 1 dealers' wrought	12.00 to 12.50
Axle turnings	8.75 to 9.25
Machine shop turnings	7.50 to 8.00
Cast borings	6.75 to 7.25
Pipes and flues	8.75 to 9.25
Sheet iron	4.00 to 4.50
Wrought drillings	7.50 to 8.00
Stove plate	11.00 to 11.25

The James H. Hall Plow works, of Maysville, Ky., has announced an increase in wages, effective immediately. The average advance is 25 cents a day.

CINCINNATI

Quiet Buying of Fair Tonnage at Prevailing Prices.

Office of THE IRON TRADE REVIEW,
808 Provident Bank Bldg., Apr. 11.

Pig Iron.—While there is very little general inquiry, a fair amount of pig iron is being sold quietly. The majority of this is in small lots, at the accepted prices which are generally known to both seller and buyer, and from which there is little tendency to deviate. The market is firm with prices unchanged, except for southern gray forge which is now quotable at $13 and standard southern car wheel which is now selling at about $25. Northern iron is perhaps a shade lower for second half delivery, although all prompt contracts are on the basis of $14, Ironton, for Northern No. 2, and the general quotation for second half is $14.25. Silvery, malleable and basic are quiet. An inquiry is out from Michigan for 1,000 tons of foundry, and several small inquiries are out from central Ohio, while the inquiries from the northern part of Ohio of the past week are still open. A melter in central Ohio, who was in the market for a small tonnage, has withdrawn. A 300-ton and 500-ton lot are among the sales in central Ohio. About 1,000 tons of No. 2 southern soft has been taken by a local pipe interest. A good melt continues locally among the foundries and the reported cutting of prices below $11 for southern No. 2 is apparently without foundation. An encouraging feature is the fact that shipments on contracts are being demanded quickly and nearly all melters are taking contract allotments up to date. With furnace stocks somewhat reduced and business fair during March, there is some indication of slightly more market activity. We quote prices based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, f. o. b. Cincinnati, as follows for prompt shipment and first half:

Southern foundry No. 2	$14.25
Southern foundry No. 3	13.75
Southern foundry No. 4	13.50 to 13.75
Southern gray forge	13.00
Mottled	12.75
Southern No. 1 soft	14.75
Southern No. 2 soft	14.25
Standard southern car wheel	25.20
Northern No. 2 foundry	15.20
Northern No. 3 foundry	14.70
Northern No. 4 foundry	14.20
Jackson county 8 per cent silicon.	17.70

Coke.—Foundry coke activity is good with specifications strong and a number of spot shipment contracts being closed, among which are a 1,000 and a 2,000-ton contract. About $2.25 for contract for the remainder of the year for 72-hour foundry coke and $2.35 for contract extending into next year is the minimum figure for good coke. Very few furnaces are pushing contracts for a longer period than the remainder of the year. Coke from the various producing districts is quoted as follows:

	Prompt shipment.	Contract second half.
Connellsville district:		
Foundry coke	$2.15 to 2.25	$2.25 to 2.40
Furnace coke	1.60 to 1.65	1.75 to 1.85
Wise county district:		
Foundry coke	2.00 to 2.10	2.00 to 2.10
Furnace coke	1.75 to 1.85	*Sliding [scale basis.
Pocahontas district:		
Foundry coke	2.05 to 2.15	2.10 to 2.25
Furnace coke	1.75	1.75 to 1.85
New river:		
Foundry coke	2.50 to 3.25	2.60 to 3.25
Furnace coke	2.10 to 2.15	2.10 to 2.20

*Sliding scale basis means $1.60 for coke based on $9, Birmingham for pig iron, with an advance of 16 2-3 per cent of the amount over $9 at which pig iron is quoted. This is the usual basis. Other forms of sliding contracts are also made.

Finished Material.—The market continues strong with a number of good specifications out for buildings, particularly in Louisville, Ky. Among the contracts coming up locally is the branch of the public library to be built for which a permit has been issued. A railroad interest at Louisville has closed for about 1,200 tons of car steel. The 1.40c, Pittsburg, mill base continues the ruling quotation.

Old Material.—A reduction of 50 cents to $1 is common on nearly all old material. Yards are stocked and there is no movement of any class of material. The large amounts of scrap have not yet come in from the country districts. Iron axles are quoted at $19.25 to $19.75. We quote the market for delivery in consumers' yards, f. o. b. Cincinnati and southern Ohio, as follows:

GROSS TONS.

Old iron rails, gross	$15.00 to 16.00
Old steel rerolling, gross	13.50 to 14.50
Old iron axles, gross	19.25 to 19.75
Steel melting scrap, gross	11.00 to 11.75
Car wheels, gross	12.00 to 12.50

NET TONS.

Old No. 1 R. R. wrought	$13.00 to 13.50
No. 1 machinery	11.00 to 12.00
No. 1 busheling	10.00 to 10.50
Stove plate	8.25 to 9.00
Machine shop turnings	6.50 to 7.00
Cast borings	5.75 to 6.50
Grate bars	10.00 to 11.00
Sheet scrap, busheled	7.25 to 8.00
No. 1 cast scrap	11.00 to 12.00
Heavy turnings	9.00 to 10.00

PHILADELPHIA

More Furnaces Retiring—Pennsylvania Buys Iron and Steel.

April 10.

Pig Iron.—Though both the Eastern Pig Iron Association and the Virginia Pig Iron Association reported further decreases in their stocks at their monthly meetings in this city the past

week makers in eastern territory are disposed to continue with the curtailment of active furnace capacity. The large Warwick No. 2 furnace as reported is out; the Standish, N. Y., furnace is now idle while the Carbon furnace will blow out around May 1. The Sheridan furnace may also go out about that time. Dissatisfaction with the low stage to which prices have receded, and in some cases, the absolute need of repairs are responsible for these changes in furnace operations. New buying is sluggish and the tonnage being booked is relatively small in the aggregate. Some of the furnaces seem more disposed to entertain propositions beyond the second quarter without insisting upon the advances previously asked but the majority of the makers are not aggressive for such business. The Pennsylvania railroad has closed for about 5,000 tons of coke and charcoal irons for second quarter delivery at Altoona. A considerable portion of the coke iron included, which totaled about 3,500 tons, went to eastern Pennsylvania makers. A number of small sales of foundry iron are being made on the basis of $15 to $15.25 eastern Pennsylvania furnace for 2X or $15.50 to $15.75 Philadelphia. The leading Virginia maker which has been holding for advances over $13 furnace for 2X will now accept this figure for early delivery. Some buyers are reporting their ability to obtain Virginia iron at $13 beyond July, but this price represents the second quarter market. The cast iron pipe makers are making few new purchases. One of these interests has renewed a contract for 3,000 tons monthly of various southern grades for the six months up to October. This contract has been in force for several years and is renewed semi-annually. Since its settlements are adjusted on a sliding scale this transaction has little bearing upon the price situation, which continues from $14.50 to $14.75 delivered for low grade iron. Basic continues stagnant at the last sale at $15.25 delivered made about a month ago. Several sales of strictly standard low phosphorus iron at $21.75 and $22 delivered are reported. The blowing out of the Standish furnace removes temporarily from the market one of the leading makers of this grade in the east. The production of this grade in the east is now at a low rate since the Heckscher furnace has been changed to basic.

We quote for prompt and second quarter shipment as follows:

No. 1X foundry	$16.00 to 16.25
No. 2X foundry	15.50 to 16.00
No. 2 plain	15.00 to 15.50
Standard gray forge	14.75 to 15.00
Basic	15.25
No. 2X Virginia	15.80 to 16.05
No. 2 southern	15.00 to 15.50
Standard low phosphorus	21.00 to 21.50

Finished Material.—The quieter condition of the finished market continues but eastern mills are enabled to maintain an average capacity of about 70 per cent upon the current volume of business. A conservative attitude as to increasing primary lines of production is being followed, some makers deeming it advisable to reduce their pig iron stocks rather than increase blast furnace operations. One leading eastern company is cutting down its stocks at the rate of 10,000 tons monthly.

Structural business is still one of the most active lines in the east but the small contracts predominate, and the sharp slashing of fabricated prices is a factor of general dissatisfaction among these interests. Plain material prices as a whole are holding firmly however, and some efforts of buyers to shade them have not been successful. The plate tonnage is good, made up usually of small business. Considerable boiler and bridge steel is being booked. Sheet buyers are closing carefully but the principal eastern producer is keeping its mills fairly full. Steel bars are quiet and bar iron prices are easy. Billet orders are small but the Pittsburg price basis is being maintained.

The 6,000 tons of plates and shapes for cars to be built by the Pennsylvania railroad at its Altoona shops is understood to have been taken by the Cambria Steel Co. at full prices. It is reported that a portion of this business was offered to other mills at concessions but declined. The McClintic-Marshall Construction Co. has 150 tons for the addition to the Alexander Bros. plant this city. Bids have gone in on 400 tons for a bridge at Yardley, Pa., for the Reading; on 300 to 400 tons for additions to the plant of the Williamson Bros. Co., Aramingo and Cumberland streets, this city; on 250 tons for the Keystone theater, this city; bids will be taken April 15 on 600 tons for the building of the Norfolk Terminal Co., Norfolk, Va. The Hamilton hotel, Washington, about 500 tons, upon which Bethlehem sections are specified and the First National Bank building, Richmond, about 1,000 tons, are assured projects of the near future. The 1,000 tons for the Reading Iron Co. mill extensions is still pending.

It is expected that the annual budget of finished iron and steel products and supplies for the Panama canal will be issued for bids in a few days. In the past this list has usually called for 15,000 tons or more of the heavier products in addition to large quantities of miscellaneous lighter supplies.

We quote for delivery in Philadelphia and vicinity as follows:

Structural shapes, 1.55c to 1.60c; steel plates, 1.55c to 1.60c; steel bars, 1.55c to 1.60c; refined bar iron, 1.35c to 1.40c; cut nails, $1.80 to $1.85; blue annealed sheets, No. 12 gage, 1.70c; 4 x 4-inch open-hearth rolling billets, $25.40; forging billets, $30.40.

Old Material.—Interest of eastern consumers in old material is represented in small purchases and in only a fair number of these. Under this light buying prices continue to sag and most grades are again off from 25 to 50 cents this week. Brokers have made some heavy steel purchases at $13.50, delivered, but no sales of importance to consumers at this level are yet reported and the market ranges from $13.50 to $13.75, delivered. Sales of No. 1 railroad wrought have been made at $16, delivered, but some mills will now pay only $15.75, delivered. Iron and steel car axle quotations are nominal and could probably be considerably shaded. The Lehigh Valley railroad disposed of about 2,500 tons in the week, including 1,000 tons of steel rails, 750 tons of railroad wrought and the remainder scattering. About $13.75, delivered, was obtained for the heavy melting steel and the prices generally accepted were lower than a month ago. The Reading list is closing today, the Pennsylvania shop list Tuesday, the Pennsylvania rails Wednesday, followed by the lists of the Baltimore & Ohio and southern roads.

We quote gross tons, delivered in eastern Pennsylvania and New Jersey consuming territory, as follows:

Old iron rails	$17.00 to 17.50
Old steel rails (re-rolling)	14.50 to 15.00
Heavy melting steel	13.50 to 14.00
Old car wheels	13.25 to 13.50
Old steel car axles	19.00 to 20.00
Old iron car axles	25.00 to 26.00
No. 1 R. R. wrought	15.25 to 16.25
Wrought pipe	13.50 to 14.00
Cast borings	8.50 to 9.00
Wrought turnings	9.00 to 9.50
Heavy cast scrap	13.50 to 14.00
Railroad malleable	12.00 to 12.50
Stove plate	11.00 to 11.50

BUFFALO

Fair Tonnages of Foundry and Malleable Sold.

April 11.

Pig Iron.—No material change is noted in pig iron conditions this week and prices are unchanged. The aggregate of iron sold has been small compared with some recent calls, but nevertheless it is fairly good, including a fair tonnage of malleable, the balance being foundry iron. While the demands of the foundries are light, the

furnace interests hold that it will be only a short time before founders are forced to come into the market, as the supply of iron held by them all through the district is small. Some of the foundries are not very busy, particularly those which depend largely on railroad work, but on the other hand there are foundries doing a general business that are working at from 75 to 80 per cent of their capacity. In spite of slightly improved prospects there is very little last half business. Some buyers are asking quotations, but furnaces seem disinclined to figure far ahead. While some interests say that they have no iron for sale below $14 the following schedule represents the market. We quote f. o. b. furnace as follows:

No. 1X	$14.00 to 14.50
No. 2X	13.75 to 14.25
No. 2 plain	13.75 to 14.25
No. 3	13.75 to 14.00
Gray forge	13.50 to 14.00
Malleable	14.00 to 14.50
Basic	14.00 to 14.50
Charcoal	17.25 to 18.00

Finished Products.—Increased activity in the Canadian trade continues to be the most interesting feature developed recently in the local territory. This is noticeable in all lines and the activity is increasing steadily with the approach of spring. Representatives of local agencies who are covering the Canadian field, say that the prospects for the next year's business are surprising, and that the demand for structural material in Canada will break all records. In the Buffalo district business is dragging along, with good prospects for future business in the structural lines. Several sizable contracts are still pending, and they may be let at any time. General lines show little change.

Old Material.—No large sales of scrap have been reported, and the situation remains unchanged. We quote gross tons f. o. b., Buffalo, as follows:

Heavy melting steel	$12.75 to 13.00
No. 1 railroad wrought scrap	14.75 to 15.25
No. 1 railroad and machine cast scrap	14.00 to 14.50
Old steel axles	18.50 to 19.00
Iron axles	23.00 to 24.00
Car wheels	13.75 to 14.25
Railroad malleable scrap	13.75 to 14.00
Machine shop turnings	7.00 to 7.25
Cast iron borings	6.50 to 6.75
Low phosphorus steel scrap	17.00 to 17.50
Old iron rails	16.75 to 17.25
Tank iron	10.75 to 11.25
Sheet iron	6.50 to 7.00
Pipes and flues	10.75 to 11.25
Stove plate	12.00 to 12.50
Grate bars	11.50 to 12.00
Boiler plate	11.50 to 12.00

The Warman Steel Co. will have its foundry at Redondo Beach, Cal., in active operation within the next thirty days. Four crucible furnaces are being built and a battery of four more is being planned. Officers of the company state that the output will be about three tons of castings per day.

ST LOUIS

Little Encouragement Seen in Either Pig Iron or Coke Markets.

April 10.

Pig Iron.—Business was duller last week than it has been at any time for the last 12 months, and there is nothing to give encouragement of an early improvement. Buyers are holding off, but their reasons for so doing remain an enigma to sellers. Several are now quoting No. 2 foundry iron at $11, Birmingham, for delivery over the remainder of the year, but the price has not attracted buyers. Inquiry is extremely light, and it is doubtful if the total inquiry in the St. Louis territory would total more than 1,000 tons at present. Northern iron is freely quoted at $14, Ironton, with very little inquiry out. Prices on southern No. 2, delivered, to which the Birmingham freight of $3.75 has been added, follow:

Southern No. 1	$15.25 to 15.75
Southern No. 2	14.75 to 15.25
Southern No. 3	14.25 to 14.75
Southern No. 4	13.75 to 14.25

Coke.—Some improvement is reported in coke inquiry, although actual buying has been light for the last week. The inquiry for 25 cars of furnace coke, noted last week, has not been closed or withdrawn from the market. Additional inquiries are out today for 50 cars of foundry coke, ranging from one to 12 cars, for delivery over the second quarter and the remainder of the year. Prices remain as follows:

We quote 72-hour Conellsville foundry grades, $2.35 to $2.50 for whole of 1911; 72-hour foundry, $2 to $2.25, on tracks and for immediate delivery; 48-hour Connellsville furnace, $1.60 to $1.85; best 72-hour Virginia foundry, $2 to $2.35; 48-hour Virginia furnace, $1.60 to $1.85. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Old Material.—Business in scrap continues dull, with quotations remaining as follows:

Old car wheels	$13.00 to 13.50
Old iron rails	14.00 to 14.50
Rerolling rails (4 ft. and over)	12.50 to 13.00
Old steel rails (2 ft. and under)	11.50 to 12.00
Light section relayers, 45 lbs. and under, subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	24.50 to 25.00
Frogs, switches and guards	12.00 to 12.50
Heavy melting steel	12.00 to 12.50
Shoveling steel	12.00 to 12.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$11.50 to 12.00
No. 2 R. R. wrought	10.50 to 11.00
Arch bars and transoms	13.50 to 14.00
Knuckles, couplers and springs	12.00 to 12.50
Shafting	14.50 to 15.00
Iron car axles	18.00 to 18.50
Steel car axles	18.00 to 18.50
Locomotive tires	14.00 to 14.50
No. 1 country wrought	9.25 to 9.75
Pipes and flues	8.50 to 9.00
No. 1 busheling	9.75 to 10.25
No. 2 busheling	6.50 to 7.00
No. 1 boiler cut	8.50 to 9.00
Boiler punchings	9.75 to 10.25
Cast and mixed borings	5.00 to 5.50
Machine shop turnings	7.00 to 7.50
Railroad malleable	9.50 to 10.00
Agricultural malleable	8.50 to 9.00
Stove plate	9.50 to 10.00
Angle splice bars, iron	12.25 to 12.50
Angle splice bars, steel	11.00 to 11.50

NEW YORK

Furnaces Less Insistent For Advances —Harriman Rail Decision.

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg., Apr. 11.

Iron Ore.—After having been held up by various delays at the shipping ports, the movement in Swedish ore to this country has again been resumed on an active scale. During the past week three cargoes arrived at Philadelphia, including one on the Tellus of 11,500 tons from Narvik. Any selling of foreign ore at this time is chiefly in single cargoes, as negotiations are deadlocked through the unwillingness of the furnaces to pay the prices asked on the better foreign offerings which remain unsold. Ocean freights, which remain high, continue as another factor unfavorable to contract making at this time.

Pig Iron.—A greater disposition to open up negotiations to cover shipments beyond the second quarter is being shown by some consumers and this is the principal development in an otherwise rather dull market. In these overtures the furnaces are holding less rigidly to their policies of asking advances for shipment beyond July and sales have been made for third quarter upon practically the same basis that has applied to prompt and second quarter delivery. One New Jersey consumer, who took 1,000 tons for last half, is reported to have closed for a certain brand of eastern Pennsylvania 2X iron at $15.50, delivered. The best known eastern Pennsylvania irons, however, continue to be held at from $15 to $15.25, furnace, for No. 2X and $15.75 to $16, New Jersey tidewater. Some Buffalo makers have been quoting $14 furnace, for 2X for third quarter to New England buyers and for nearby shipment $13.75 can be done. The principal new inquiry before sellers is from a pipemaker and calls for 6,500 to 8,000 tons of 2X, 2 plain and No. 3 grades for last half delivery at New Jersey and New York state plants. A New Jersey boiler manufacturer is inquiring for 1,000 tons of foundry grades for last half. Several thousand tons in addition have been put out by regular customers to the furnaces which customarily supply them, including several lots of malleable. An eastern cast iron pipe interest, which has been sounding the mar-

ket has encountered the reported scarcity of low grade irons and was quoted advanced prices. Pipe iron in the east is now quotable at from $14.50 to $14.75, delivered, depending upon the character of the iron. The Virginia market is easier in that the leading maker in that territory, which has been holding for $13.50 for 2X for second quarter, will now accept $13 for this delivery. A sale of a small lot of Virginia 2 plain to a Connecticut buyer for early shipment at less than $13, furnace, is reported. Virginia makers are now generally quoting $13, furnace, for 2X up to July. The General Electric Co. is inquiring for 2,200 tons of 2 plain and 2X grades for early shipment at Schenectady. This is in addition to 1,000 tons of high silicon iron for Pittsfield, Mass., which it is reported to have placed. One of the Delaware River pipe companies in the east is negotiating for several thousand tons of lower grades. Reliable information as to the final disposition of the inquiry for 6,000 tons of basic by the Dominion Iron & Steel Co., Sydney, N. S., has not been obtained. This sale was reported on Birmingham advices to have gone to southern furnaces which have the advantage on this business by water freight but during the week word was received from the prospective buyer that it was still negotiating for a tonnage this grade. Whether this is in addition to its original inquiry has not been learned. We quote for prompt and second quarter shipment at New York tidewater, as follows:

Northern foundry No. 1	$16.00 to 16.25
No. 2X foundry	15.50 to 15.75
No. 2 plain	15.00 to 15.50
No. 2 Virginia	15.80 to 16.05
No. 2 southern foundry	15.25 to 15.75
Malleable	15.75 to 16.00
Gray forge	14.75 to 15.00

Ferro-Alloys.—New buying in ferro-manganese is small and about 1,500 tons of inquiry for western shipment which has been before sellers for several weeks, is still pending. Very low prices are still reported as being available but no sales below $36.50, Baltimore, have been noted. In some cases, offers have been solicited from consumers at $36, seaboard, for submission to foreign makers, but it is not known that such prices would be acceptable. The 50 per cent ferro-silicon market is very quiet but prices have not improved. We quote 80 per cent ferro-manganese at $36.50 to $37, Baltimore, for prompt shipment and 50 per cent ferro-silicon at from $53 to $54, Pittsburg.

Cast Iron Pipe.—Sellers of pipe are still awaiting developments in the large prospective purchase of 48-inch grades, which it is known the greater New York authorities contemplate. The latest report put out is that bids will shortly be asked on 5,000 to 6,000 lengths or about 20,000 to 24,000 tons of 48-inch. General business in the market continues fair but competition is keen. John Fox & Co. are the low bidders on 1,180 tons of pipe and specials for metropolitan burroughs and the Donaldson Iron Co., Emaus, Pa., will supply the material. The bid on the straight pipe was $21.85, delivered. Bids went in this week on 900 tons for the Phillippine Islands, taken by the war department. A number of lettings are scheduled for April 17, including 3,500 tons for New Bedford, Mass., 1,500 tons for Attleboro, Mass., and a small lot for Bloomfield, N. J. We quote 6-inch pipe at from $21 to $22, f. o. b. New York, in carload lots.

Finished Material.—Prices of plain structural material were reported as generally staple at 1.40c, Pittsburg, at a meeting of a number of the principal makers of these products in New York City the past week. This condition, however, apparently has little bearing on fabricated steel prices, in which sharp cutting prevails.

Finished conditions, as a whole, continue of a quiet character, but in some lines there is still a very fair business moving. Structural lettings are fair with the small contracts in the great majority. The railroad tonnage is extremely light. The principal contract to appear in this district is that of an insurance exchange building in Maiden Lane, this city, which will require 8,000 tons. Bids have been entered, but no awards have been announced. The Phoenix Bridge Co. has taken 1,000 tons for the Central of New Jersey car shops at Elizabethport, N. J.; the American Bridge Co., 400 tons for a building for the New England Telephone and Telegraph Co., at Portland, Me., 600 tons of reinforcing material for the Sixth and Ninth avenue elevated lines of the Interborough Rapid Transit Co. and 250 tons of roof trusses for an addition to the plant of Landers, Frary & Clarke, New Britain, Conn. Levering & Gerrigues have 425 tons for a loft at Grand and Center streets, this city. The Boston & Maine railroad continues active in putting out bridges and other steel work, which is a part of the rehabilitation of that system. During the past several months, probably 7,000 tons, principally in small bridges, has been placed and considerable more tonnage is in prospect. The latest award is a 130-ton bridge to the New England Structural Co. The New Haven has placed a 225 ton bridge at Blackstone, Mass., with an independent shop. Bids have gone in on 500 tons for a highway bridge at Bayonne, N. J., on 1,500 tons of center sills for the Chesapeake & Ohio Railroad and for a 250 ton span across the Savannah river for the Seaboard Air Line. About 1,200 tons of boiler supports are up for a power plant for the Lehigh Coal & Navigation Co., at Wilkesbarre. The Ordway building, Newark, N. J., 500 tons, and a loft up town for the Van Buren estate, 500 tons, or more, are up. No action has yet been taken on the 2,000 tons of miscellaneous work pending for the New York Central or the 2,000 tons of bridge work for the Grand Trunk. Projects are developing for the erection of two additional telephone exchanges in this city and one in Buffalo. The Reither Building, Waterbury, Conn., 1,000 tons, will take bids April 15.

The Pittsburg & Lake Erie railroad is expected to close this week on its inquiry for 1,000 steel hoppers and 1,000 steel gondola cars. The Bethlehem Steel Co. has placed 100 steel coke cars with the American Car & Foundry Co.

We quote, New York delivery, as follows: Angles, 3 to 6 inches x ¼ inch and heavier, 1.56c to 1.61c; beams, 3 to 15 inches, 1.56c to 1.61c; tees, 3 x ¼ inch and heavier, 1.56c to 1.61c; plates, carload, tank, 1.56c to 1.61c; boiler steel, 1.66c to 1.71c; marine boiler, 1.96c to 2.01c; bar iron, 1.37c to 1.42c; soft steel bars, 1.56c to 1.61c.

Rails and Track Material.—A contract was finally closed this week by the Harriman system for its initial order of 72,000 tons of rails. Of this lot 33,000 tons of open-hearth will be furnished by the Colorado Fuel & Iron Co., 21,225 of Bessemer by the Illinois Steel Co. and 18,000 tons of open-hearth by the Tennessee Coal, Iron & Railroad Co. This order represents maintenance needs of the system and is expected to be followed by additional orders later in the year. The Pennsylvania Steel Co. has taken 2,000 tons of girder rails for the Brooklyn Rapid Transit Co. and 500 tons for Denver street railways.

Old Material.—Sizeable sales in any grades are few, as buyers are proceeding cautiously with new purchases. The general tone of the market continues towards weakness and prices in several grades are further reduced. Offers of leading eastern buyers at present are about $13.50, delivered, for heavy steel, $15.75 to $16, delivered, for No. 1 railroad wrought, and $13.50 to $13.75, delivered, for heavy cast. In some grades so little business is being done that quotations are nominal. We quote, gross tons, prices New York dealers will pay at tide-

water, with the exception of cast scrap, which has a local demand, as follows:

Old car wheels	$12.00 to 12.50
Old iron axles	22.50 to 23.00
Old steel shafting	16.00 to 16.50
Heavy melting steel	11.00 to 11.25
No. 1 R. R. wrought	13.75 to 14.25
Iron track scrap	12.00 to 12.50
Wrought pipe	11.00 to 11.50
Cast borings	6.00 to 7.00
Wrought turnings	7.00 to 7.50
Heavy cast scrap	11.50 to 12.00
Railroad, malleable	10.00 to 10.50
Stove plate	9.50 to 9.75
Grate bars	9.00 to 9.50

No Appreciative Increase in Furnace Yard Stocks.

April 10.

Pig Iron.—The reports in hand at the close of last week show a fairly attractive tonnage in the aggregate to have been sold, but that the delivery in the majority of sales extended beyond the first half of this year and that a higher price than $11 per ton at Birmingham was not received. No sale for spot shipment was made at a lower price than the $11 schedule, and notwithstanding the rumors to the contrary, it is not believed that any tonnage is available at such figures. With the revision of quotations by another large producer to a basis of $11, Birmingham, for deliveries through the third quarter, the market for that delivery is practically fixed at such a price, and as a result, the buying interests are no doubt less inclined to buy for last quarter shipment at a higher price. The fact that stocks on furnace yards did not increase during March, as is shown by the actual figures for April 1, notwithstanding the addition of two stacks to the active list during the month, is a very significant one, and is rather surprising to the most conservative authorities. It is noted with interest that the accumulation of basic iron was very materially reduced, as is the fact of the continued strong demand for car wheel iron and other materials for use by the railroad companies. The local situation as to foundry iron has been affected by the comparatively small consumption by the manufacturers of cast iron water pipe. With the plants of two such manufacturers idle for some months, there has no doubt been manufactured in competitive territories such a quantity of cast iron pipe as would have required several round tonnages of foundry iron. The scarcity of such iron as is generally bought by the pipe interests continues, however, notwithstanding the curtailed operations.

Cast Iron Pipe.—A contract for 1,000 tons of water pipe was placed with a southern manufacturer last week and at prices representing an average price around $21 per ton, Birmingham. Several smaller lots of 6 and 8-inch water pipe were also placed with the prices received indicating the maintenance of quotations as published. A round tonnage for requirement in the middle west will come up for letting during the coming week and bids have already been submitted on a like tonnage for requirement in the south. It is understood that the small orders for municipal requirement soon to come up aggregate a fair tonnage and manufacturers are quite confident of sufficient new business to warrant steady operations during the coming month. The schedule of quotations as last published has not been changed and we continue to quote water pipe as follows, per net ton, f. o. b. cars here: 6 inch to 10 inch, $22; 12 inch, $21; over 12 inch, $20, with $1 per ton extra for A class pipe or gas pipe.

San Francisco

Some Shading of Pig Iron Prices to Get Business.

April 6.

Pig Iron.—The local market remains about the same as heretofore, foundries running from half to three-quarters time but with a gradual betterment of prevailing conditions. The local market is well stocked with all grades of pig iron and there is a decided tendency to shade prevailing quotations to book orders. One thousand tons of Chinese iron arrived a few days ago and is being distributed among the cities of the state. We quote:

Heroult pig	$25.00
Continental	22.50 to 23.00
Chinese	23.00
English	23.00
Southern No. 2, f. o. b.	21.00 to 22.00

Finished Material.—Dealers are quietly figuring on the finished material to be used in the proposed $1,000,000 city hall to be erected in Oakland. According to specifications about 4,000 tons of structural material will be used in the building, nearly half of that amount being reinforcing bars. The Ralston Iron Works is making deliveries of 500 tons of structural for the new Alcazar theater building. Beams and channels from store are quoted at $2.65 for 3 to 15 inches and bars, both iron and steel, at 2 cents. There are still many electric and steam railroad extensions in prospect and salesmen are working hard to land spring orders. The Pennsylvania Steel Co. was awarded the contract for 500 tons of high T, 72-pound rails, by the Los Angeles Railway Corporation early in the week. The price was $50 per ton, delivered.

British Iron Market

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., April 1.

Conditions in the pig iron market this week have again been depressing. Buying forward both in the North and in the Midlands is almost at a standstill, and the belief that prices have already reached their lowest is much shaken. The chief reason assigned for the present depression in prices is over-production. At present, both speculators and makers are anxious to sell, while users have no inducement to go in for extensive forward commitments. The market has further been overcast as to the Midlands by the heavy failure of Tupper & Co., Ltd., which has hit several firms very hard and has provoked forebodings of further similar disasters. The present state of things is all the more discouraging from the fact that the period has arrived when in normal times a revival is expected. The German production of pig iron now meets home requirements and the surplus for export seems likely to become a matter to be reckoned with seriously by British producers. Stocks of Cleveland iron continue to increase the quantity in Connal's stores, having increased during the past month by 17,385 tons, whereas at this time of year a rapid reduction is usually expected. No. 3 Cleveland G. M. B. is quoted at 47s 9d ($11.70) for early f. o. b. delivery, and Cleveland warrants at 47s 4d

METAL MARKETS

New York.

April 11.

Tin.—The pig tin market has retained the firm tone commented on last week. On Monday, the prices of spot advanced to £195 in London, and to 42.37½c in the New York market. While the improvement in prices was directly due to syndicate operations, the statistical position of the metal is considered all in favor of firm prices. The demand from domestic consumers during the week has not been large, but what there was, sufficed to absorb local offerings, and hold prices here up to the foreign equivalent.

Spot sold at 41.70c in the local market today. The closing cable from London showed a decline in spot of £2 7s 6d, and in three months of £2 5s. Spot closed at £192 2s 6d, and three months at £187 10s.

Tin arrivals since April 1, aggregate 2,226 tons, and there are 1,389 tons afloat.

Copper.—The March statistics furnished a surprise to the trade. The report of the Copper Producers' Association announced an entirely unexpected feature in the record of production for the month, which is the largest total of output ever reached. The net result, however, was less unfavorable than was anticipated, due to the heavy shipments into domestic consumption. Production rose to 130,532,080 pounds, and exceeded the previous high mark of August, 1910, by 2,728,462 pounds. Deliveries into domestic consumption were 66,080,789 pounds, and for export 59,081,127 pounds, and surplus stocks increased 5,370,164 pounds. At the close of March, the latter item stood at 162,007,934 pounds, compared with 123,824,874 on the corresponding date in 1910. The effect produced by the statement on the market, was to increase hesitancy in buying. Prices are practically nominal. Electrolytic can be bought under 12.37½c, delivered, and lake at 12.37½c.

Exports of copper since April 1 are 7,764 tons.

Lead.—Prices are being well maintained, though the offering price of independent sellers is still 5 points under that of the leading interest. Good brands can be had at 4.45c in New York from the former.

Spelter.—Sales have been made recently at 4.30c in St. Louis, and 4.45c in New York. This is a decline of 5 points from last week. There is little demand from consumers, and a freer desire to sell by disappointed holders.

Antimony.—The market continues dull, with special brands available from ½c to ¾c, under the convention's quotations. Cookson's is 9.50c, Hallet's is 9.25c, and Hungarian is 9c.

St. Louis.

April 10.

Lead and Zinc.—Choice lots of zinc ore brought a top price of $43 a ton in the open market in the Missouri-Kansas-Oklahoma district last week, ranging down to $40.50 and $33 on a base of 60 per cent ore. The contract price was $40.38 a ton where the base prevailed at $36 to $37. The surplus at the close of the week was estimated at 14,000 tons, and the output at 5,400 tons. Some of the larger producers have shut down their mines, and others are talking of doing likewise. Choice lots of calamine brought $26 a ton, with 40 per cent grades ranging from $22 to $24 a ton.

Lead ore in Missouri-Kansas-Oklahoma district brought $57 a ton for choice lots, and $56 to $54 on an assay base.

Pig lead closed in East St. Louis at 4.30c, and spelter at 5.27½c to 5.30c.

Chicago.

April 10.

New Metals.—Buyers of spelter in the Chicago territory are fairly satisfied with current quotations. Chicago consumers felt that higher prices, particularly those ruling during March, were not justified by actual conditions in the market, and when spelter went higher than 5.45c, East St. Louis, local consumers quit buying. Just at present, however, consumers are showing more interest in their requirements and spelter buying in this territory is moderately active. Lead is fairly steady and tin advanced ¾c during the week. There is considerable quiet buying of copper for immediate consumption, but not enough to give much snap to the market. Copper consumers are cautious in covering for their future requirements.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

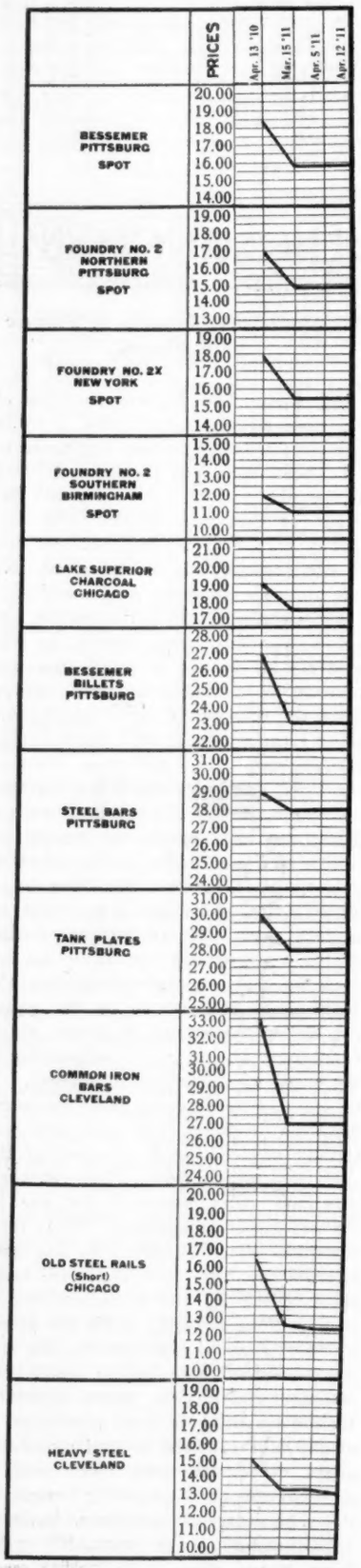
Lake copper, carload lots, 12¾c; casting, 12⅝c; smaller lots, ¼c to ⅜c higher. Spelter, car lots, 5.32½c to 5.37½c; lead, desilverized, 4.35c in 50-ton lots; corroding, 25c per 100 pounds higher; sheet zinc, $7.50 list, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 43c; Cookson's antimony, 10¼c; other grades, 9c to 10c.

Old Metals.—Copper is a little unsteady, but aside from this feature the market is practically unchanged. Consumers have things practically their own way since dealers are pressing sales, but there is not much chance for lower prices, since quotations are now about as far down the scale as they can get.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Copper wire, 12c; heavy copper, 11⅞c; light copper, 11c; heavy red brass, 11c; heavy yellow brass, 9c; light brass, 7c; No. 1 red brass borings, 9½c; No. 1 yellow brass borings, 7½c; brass clippings, 8½c; tea lead, 3.80c; lead scrap, 4⅜c; zinc, 4½c; tin pipe, 39c; tin foil, 36c; pewter, 29c; electrotype plates, free from wood, 4c; electrotype dross, 3c; stereotype plates, 4½c; stereotype dross, 3¼c; linotype dross, 3¼c; prime slab zinc dross, $75 per ton.

PRICE CHART



FOUNDRY PRACTICE

Papers to be Read at Foundrymen's Convention in Pittsburg.

All phases of latter-day gray iron, steel, malleable and brass foundry practice will be discussed at the annual meetings of the American Foundrymen's Association and the American Brass Founders' Association, which will be held in Pittsburg, May 23-26. The number of papers already prepared exceeds the total presented at any previous convention, and in addition to the 45 topics assigned by the program committee, promises have been received from a number of foundrymen of papers in course of preparation, the titles for which will be announced later.

The following papers will be presented before the American Foundrymen's Association:

"Economical Insurance for Foundry Properties," by S. G. Walker, Providence, R. I.
"Foundry Construction," by Geo. K. Hooper, New York City.
"Vanadium Iron and Steel Castings," by G. L. Norris, Pittsburg.
"The Foundry at Close Range," by Benj. D. Fuller, Cleveland.
"The Permanent Mold," by Edgar A. Custer, Philadelphia.
"Titanium in Iron and Steel Castings," by Chas. V. Slocum, Pittsburg.
"Production Costs," by Ellsworth M. Taylor, New York City.
"The Manufacture and Annealing of Converter Steel Castings," by Bradley Stoughton, New York City.
"The Electric Steel Furnace for Steel Castings," by Dr. P. Heroult, New York City.
"Titanium in Malleable," by C. H. Gale, Pittsburg.
"The Practicability of the Induction Furnace for the Making of Steel Castings," by C. H. Vom Baur, New York City.
"The Rotary Blower for Cupola Use," by R. H. Rice, Schenectady, N. Y.
"Open-Hearth Steel Foundry Practice," by R. A. Bull, Granite City, Ill.
"Pattern Shop Apprentice," by Jabez Nall, Cleveland.
"The Application of Lifting Magnets to Foundry Work," by A. C. Eastwood, Cleveland.
"Electric Motor Drive for Foundries," by Brent Wiley, Pittsburg.
"The Small Open-Hearth Furnace for Steel Castings," by Walter MacGreggor, Chicago.
"Microscopic Structure of Iron and Steel," by Prof. Wm. Campbell, New York City.
"Manganese and Silicon in the Foundry," by A. E. Outerbridge Jr., Philadelphia.
"Gas Cavities Shot and Chilled Iron in Iron Castings," by Thos. D. West, Cleveland.
"Coremaking and Core Machines," by Arch M. Laudon, Elmira, N. Y.
"Molding Machine Practice," by E. H. Mumford, New York City.
"Machine versus Hand Molding," by John Alexander, Philadelphia.
"Defective Castings and How to Handle Them," by John M. Perkins, Detroit.
"Core Room Practice," by F. A. Coleman, Cleveland.
"Cupola Melting Practice," by P. Munnoch, New York City.
"Malleable Castings," by W. P. Putman, Detroit.
"The Equipment of Air Furnace Using Oil as Fuel," by N. W. Best, New York City.
"Instruction Paper on Phosphorus in Cast Iron," by H. E. Field, Pittsburg.
"Mechanical Charging of Cupolas," by G. R. Brandon, Harvey, Ill.
"Pattern Equipment," by W. S. Giele, Philadelphia.
"Recovery of Foundry Waste," by S. A. Capron, Westfield, Mass.
"Cupola Practice," by R. H. Palmer, Salem, O.
"The Foundry Foremen's Educational Movement," by D. O. Wilson, Newark, N. J.
"The Briquetting of Metal Borings and Turnings," by Dr. R. Moldenke, Watchung, N. J.
Presentation of data on the molding sand tests of the American Foundrymen's Association.
Memorandum on the standard test for cast iron.

While the program of the American Brass Founders' Association is not yet completed, papers already assigned and their authors, follow:

"Alloys," by Dr. W. R. Whitney.
"Corrosion of Brass Foundry Products," by Wm. Vaughan, of A. D. Little, Inc.
"The Pouring and Melting Points of Some High Grade Bronzes," by C. P. Karr.
"Vanadium and Its Non-Ferrous Alloys," by V. C. Lassen.
"The Pyrometer and the Aluminum Foundry," by H. W. Gillett.
"Non-Ferrous Foundry Economics—Refinements," by E. A. Barnes.
"Determination of Nickel in Alloys," by S. W. Parr.
"Equilibrium Diagram," by H. W. Gillett.

Proposed Coke Freight Rate for West

The present differential in freight rates between blast furnace coke and commercial coke from the Connellsville, Pa., and West Virginia districts, to Chicago, Detroit and Toledo, will be eliminated, May 15, and a flat rate will apply. At the present time, the freight rate on furnace coke from Connellsville, Pa., and West Virginia regions to Chicago, is $2.35 per ton, while the freight rate on commercial coke to the same point is $2.65 per ton. Under the new tariff there will be but one freight rate on coke to Chicago, and this will be $2.50 per ton. The rate to Toledo will be $1.95 per ton instead of $1.85 on furnace coke, and $2.25 on commercial coke. The flat rate to Detroit will be $2.10 per ton instead of $2 on furnace coke, and $2.25 on commercial coke. There will be no change in the freight rate on coke to Cleveland, the rate being $1.65 per ton.

Stockholders of the Union Steel Casting Co., Pittsburg, will meet April 18 to vote on an increase in the capital stock from $1,500, to $2,500,000. As noted recently this company has purchased additional property adjoining its plant at Sixty-first and Butler streets, Pittsburg, and is taking bids on an addition to its present works.

Wm. Swindell & Bros., engineers and contractors, Pittsburg, have removed their offices from the German National Bank building to the new Jenkins Arcade building, occupying suite 5034 to 5037.

The Crane Valve Co., Bridgeport, Conn., has been authorized by the Connecticut general assembly to increase its capital stock from $800,000 to $5,000,000.

METAL TRADES

Association Opens Annual Convention in New York.

New York, April 12. (By wire.)

The thirteenth annual convention of the National Metal Trades Association opened this morning at the Hotel Astor with a large attendance. The morning was devoted to hearing reports of the officers. President J. H. Schwacke in his report discussed industrial education and urged careful consideration of this subject. He congratulated the association on its very pleasant relations with the National Founders' Association as well as on the sound condition of its finances while deploring the untimely agitation among some mechanics for an 8-hour work-day. Commissioner Robert Wuest in his report indicated reasons for the prosperous condition of the association.

Marshall Cushing, special representative of the association and National Founders at Washington, presented a detailed statement on the condition of national legislation the past year bearing upon industrial conditions. This afternoon will be devoted to the consideration of "Labor Efficiency Betterment" or wellfare work. Papers will be presented by John Calder, of Ilion, N. Y.; H. F. J. Porter, M. E., of New York City; and W. A. Grieves, of Columbus, O.

Guests at the annual meeting of the alumni last night presented President Schwacke a gold watch and chain.

Iron Ore Booklets

The annual booklet issued by the Lake Superior Iron Ore Association, giving the complete cargo analyses of Lake Superior iron ores, has been issued. Copies may be obtained by addressing the secretary, W. L. Tinker, 310 Rockefeller building, Cleveland.

The Shenango Furnace Co., Pittsburg, has issued its annual booklet of ore analyses, which, as in previous years, is handsomely illustrated by views of the properties of the company.

Small Increase in Unfilled Tonnage

The United States Steel Corporation's monthly statement of unfilled orders issued today shows unfilled orders on its books as of March 31, of 3,447,301 tons, as compared with 3,400,543 tons on Feb. 28, an increase of 46,758 tons.

Electric Furnace and Refractory Material

Thoroughly Discussed at the Annual Meeting of American Electro-Chemical Society in New York City

The nineteenth general meeting of the American Electro-Chemical Society convened in New York on Thursday of last week. The place of meeting was the beautiful, well-appointed and well located new building of the Chemists' club on Forty-first street, near Madison avenue. Some 250 members and guests were in attendance, the meeting making up in the interest of papers and their discussion for the small attendance.

The morning hours of each day were devoted to business and the reading of papers, while attractive excursions were planned for the afternoons. These included visits to the Laurel Hill works of the Nichols Copper Co. in Brooklyn; the electroplating plant of Hanson & Van Winkle Co. in Newark; the electro-engraving and electro-typing processes of the Moss Engraving Co. in New York; the laboratories of Columbia University, of the College of the City of New York and of the New York Electrical Testing Co.; and the Perth Amboy plant of the American Smelting & Refining Co. All of these were greatly enjoyed by those who participated in them.

At the Nichols Copper Co.'s works the smelting of copper mattes and ores and the Bessemerizing of gold and silver-carrying copper mattes in small, silica-lined converters was shown. The plants of the Moss Engraving Co. and of the Hanson & Van Winkle Co. were models of their class and of great interest in many ways. The beautiful group of new buildings of the College of the City of New York, located on the high and historic ground of Lafayette's headquarters in revolutionary times, are equipped with every conceivable convenience for modern college education. This college presents the unique plan of furnishing a splendid practical college training to the youth of a great city free of all cost. At the American Smelting & Refining Co.'s plant were shown the latest processes of treating silver and gold-containing copper and lead products, the most interesting things perhaps being the large magnesia-lined converters for Bessemerizing copper mattes and the electrolytic separation of gold and silver. The smelting of lead and copper ores to produce lead bullion and copper matte, the desilverization of the base bullion by zinc and the cupellation of the lead-gold-silver alloy were also seen.

The large number of papers presented concerning the electrical furnace for steel-treating and their interesting discussion made the meeting one of especial attraction to those engaged in the iron and steel industry. Among these was a discussion of C. G. Osborn's paper on his experience with the electric steel-refining furnaces at South Chicago, which was read a few weeks ago before the Chicago section. In this it was brought out that electrically refined steel is superior to other varieties in being freer from gas and hence denser and, in being unaffected by segregation except at the pipe. It was stated that electrically-refined steel of 0.15 per cent carbon possesses the strength and other properties of other steel of 0.22 per cent carbon, with other grades in proportion. The Worcester, Mass., furnace of the Steel Corporation was said to have the advantage over that at Chicago in having more convenient room and in the method of hanging the electrodes which permits of much more rapid replacement. The electrodes now used were said to be ungraphitized and have a section of 14 inches. Mr. Osborn evidently thinks well of the present use and success of the process, but expressed no opinion as to its future extension. T. F. Bailey gave a description of a small electric furnace for heating steel bars and billets for forging, in use at Transue & Williams Co.'s plant at Alliance, O. This paper is published in full in this issue.

Electric Converter.

A paper by A. E. Green contained a proposal for an entirely new process of converting pig iron into steel, by which most of the present metal waste is to be eliminated. This paper is published in full elsewhere. If such a process can be operated with commercial success, it would certainly work a revolution in the steel-making industry.

The paper by Carl Hering, on "A New Type of Electric Furnace," proposes to make use of the well-known "pinch effect" previously described by him to cause a vigorous circulation of the metal, where the heating is produced by passing the current through the metal. The furnace has two electrodes conducting the current in and out of the bottom of two narrow refractory-lined wells of metal, connecting above with the larger body of metal and slag. The advantage of the circulation of metal is the rapid reaction it produces between slag and metal.

Papers by James Lyman and by F. T. Snyder, discussing, in a general way, the province of the electric furnace in the iron and steel industry, which had been read before the Chicago section some time since, were presented for discussion, but no further points were brought out.

The paper by Prof. C. F. Burgess of Madison, concerning the use of electrolytically refined iron in steel-making and for special purposes expressed the opinion that under present commercial conditions, this material could be economically used for various high grade varieties. J. W. Beckman presented the results of some preliminary experiments on the production of vanadium, chromium and other metals and alloys from fused electrolytes, but his results were obtained in such as was as to leave doubts as to whether the metals were the result of electrolysis or of the reaction of carbon on the metal salts at the high temperature used.

A paper of great interest to those having to do with highly refractory materials and furnace linings was read by L. E. Saunders on the electrically fused alumina made by the Norton Co. He exhibited two varieties of this material, one white and crystalline and practically pure alumina, having a melting point between 2,050 degrees and 2,100 degrees Cent., a hardness above 9 and a density between 3.93 and 4. The other is dark and has a melting point near 1,900 degrees Cent. This is not much lowered by heating in contact with lime or magnesia, but is with silica. Brick and many forms of tubes, muffles, crucibles and other utensils made from powdered alundum with a clay binder were shown. These were said to with-

stand the temperature of melting platinum. The bricks shown were said not to be slag resistant, but extremely refractory and adapted to furnace arch construction. Their chief drawback is their high cost.

Electric Resistance Furnace.

A new electric resistance furnace described by F. A. Fitzgerald consists of a graphite resistor placed above the refractory-lined place to be heated. The heat is applied by radiation from the resistor. For very high temperatures and oxidizing conditions, graphite resistors coated with carborundum were shown, and were said to have a long life when in use. Refractory brick were said to have the following order of resistance: 1 Alundum, 2 Grecian magnesite, 3 Brown magnesite, 4 Beauxit, 5 chrome, 6 silica. The Johnson electric zinc furnace was decribed in a communication by Prof. J. W. Richards and a near commercial success predicted for it. The furnace consists of a rectangular or cylindrical box with one electrode, introduced through the arched roof. The bottom contains a layer of molten cast iron with which the other pole is connected. The ore and reducing coal is fed in through the arch by the upper electrode, the heat of resistance or arc distilling the reduced zinc, and fusing the slag, matte and reduced lead, if present. A small laboratory or household resistance-heater with the resistors made in small replacable sections was described by M. M. Kohn. "The Condensation of Zinc Vapors" was discussed in a paper by F. J. Snyder, and "Polarization in its Relation to the Decomposition Pressure of Electrolytes," by Oliver P. Watts. W. R. Landis told of some experiments with gold-flashed steel pens which showed that they were much more rapidly deteriorated by corrosion from ink than plain steel pens because of the galvanic action set up between gold and steel as soon as the pen point was slightly worn. "Some of the Unsolved Problems of the Electroplater" were described by G. B. Hogaboom. Both the author and those who discussed the paper, including Dr. Walker, the president, lamented the fact that those conducting industrial processes did not more freely discuss their technical troubles. The backwardness of the electroplating process technically was ascribed to the general secretiveness of those engaged in its operation. It was the general opinion that a person freely discussing such problems received many times as many valuable points as he personally disclosed. A new form of lead accumulator was described by its inventor, F. O. Tate, and a model shown illustrating its construction. It was stated that its capacity is about twice that of the common construction for the same weight of lead.

A method of making aluminum by the Hall process in a small laboratory furnace, such that the ordinary student can successfully use, was described by Prof. H. K. Richardson, of Pennsylvania State College, with detailed drawings and dimensions. This should be of great interest and aid to those in charge of electro-chemical laboratory work in our technical schools, as such experiments that "work" are not easily devised.

The use of mercurous perchlorate solution as an electrolyte in a mercury coulometer was advocated in a paper by F. C. Mathews and H. F. O. Germann. The advantages over other electrolytes are that the perchlorate is stable, has a low resistance, is readily soluble in water and the amount of mercury deposited is so large that it may be measured with sufficient accuracy instead of being weighed.

A paper by L. A. Parsons on "Electric Discharges in Gases at Reduced Pressure," was read by title only and briefly discussed by the president, Dr. Walker. Prof. J. W. Richards read a paper on "The Mechanism of Electrolytic Transfer," in which he proposed quite a new theory of electrolysis, which at once destroyed the law of definite proportion as far as fused electrolytes are concerned, and the present ionic theory of electrolysis, both of which are apparently well established, and the former of which has been the main guide post of all chemists since the time of John Dalton. The paper was read at the end of Friday morning's session and so was hardly at all discussed, but the general feeling seemed to be that Prof. Richards had not "made a case."

The much advertised Clancy process of cyaniding gold ores, an account of which was presented to the New York section of the Electro-Chemical Society last December, was vigorously criticized by N. S. Keith, the veteran metallurgist of Philadelphia. The paper was taken up in detail by Mr. Keith and its weak points mercilessly held up to view and caustically commented upon in a witty manner.

The social features of the meeting included a dinner, Thursday night, served in the convenient quarters of the Chemists' Club and attended by most of those present at the meeting and by many of the ladies, and a smoker, Saturday night, where all the prominent participants were duly "roasted." The election of officers, the results of which were announced on Thursday morning, showed that Dr. W. R. Whitney, of the General Electric Co., at Schenectady, a past president of the American Chemical Society, was chosen president for the coming year. The present secretary and treasurer, Prof. Richards and Mr. Salom, respectively, were re-elected. The president-elect responded in a short address, whose topic was optimism, a typical attitude for him. The treasurer's report showed the financial condition of the society as entirely satisfactory, with a growing permanent fund.

WORKS TRANSFER

Will be Voted on by Firth-Sterling Stockholders.

A special meeting of stockholders of the Firth-Sterling Steel Co., Pittsburg, has been called for June 12 to vote on a proposition to sell 358.78 acres along the Potomac river in the District of Columbia, including buildings, machinery, etc., which comprise the projectile plant belonging to this company, to the Washington Steel & Ordnance Co. This is a corporation organized to take over and operate this projectile plant. The Firth-Sterling Co. will receive in payment capital stock of the Washington company. The stockholders will also be asked to vote for a reduction of the common stock to the amount of 7,500 shares, and the issue in lieu thereof of 7,500 shares of preferred stock, representing $750,000 of capital stock.

Will Move Offices

The United States Cast Iron Pipe & Foundry Co. will move its Chicago offices on April 17 from the Rookery building, where they have been located for 12 years, to Nos. 923-25-27 Peoples' Gas building. About double the space used in the Rookery building will be occupied in the new quarters.

Welsh Tin Plate

Swansea harbor trust returns for the week ending March 25, with comparisons, follow:

	Week of Mar. 25. Boxes.	Previous week. Boxes.	Corresponding week last year. Boxes.
Received	118,148	109,654	87,935
Shipped	118,378	77,843	75,435
Stocks	276,054	276,284	187,154

LONG LOOK AHEAD

By Tom L. Johnson Located Steel Works at Lorain, O.

Hon. Tom L. Johnson, whose death occurred at Cleveland on April 10, was one of the first inland steel manufacturers to recognize the potentialities of the great lakes district for the successful manufacture of iron and steel. After considering carefully the respective advantages offered by other manufacturing centers such as Pittsburg, Youngstown and the southern shore of Lake Erie, he decided upon the latter and fixed upon Lorain, O., as the point to which to remove the Johnstown, Pa., works with which he was then identified.

Mr. Johnson was born July 18, 1854, on his father's plantation in Scott county, Ky. When the war ended and the Johnson family had little money, Tom L. started out to make his own way. On the street railway line at Louisville, owned by a relative, he was given a position at the age of 15, steadily advancing until he became superintendent. He became secretary of the company and invented several devices, among which was a farebox which brought him $30,000. At 22 years he, with the help of relatives, secured a controlling interest in the Indianapolis street railways, and in 1882 he invented a new style of street railway rail which became known as the Johnson girder rail. These were first rolled by the Cambria Steel Co., but Mr. Johnson became convinced that there was money in the steel business and especially in the rail and railway specialties business. He formed the Johnson Steel Street Railway Co., which built works at Johnstown, Pa., in 1887-8, including seven heating furnaces and a 26-inch train of rolls, having an estimated capacity of 90,000 tons of rails per annum. The officers were: President, A. J. Moxham; vice president, Tom L. Johnson, Daniel Coolidge afterward becoming second vice president; treasurer, A. B. DuPont. Later switch and drop forging works were added as well as an electric welding plant.

In 1894-5 the Johnson company built at Lorain, O., using the rail mill machinery from the Johnstown works. The first steel was made in two 12-ton Bessemer converters, April 1, 1895. Two blast furnaces were added, one being lighted in July and the other in August, 1899. When the Federal Steel Co., one of the precursers of the United States Steel Corporation, was formed in 1900, the Lorain Steel Co., as it was then known, was sold to the Federal company. With this sale Mr. Johnson's connection with the iron and steel business ended.

In 1888 Mr. Johnson entered politics, running for congress on the Democratic ticket in the Twenty-first Ohio district against Theodore Burton, Johnson having taken up his residence in Cleveland. He was defeated, but in 1890 he defeated Mr. Burton who ran for re-election. While in elected in 1892 but in 1894 Burton defeated him. He was elected mayor of Cleveland in 1901 and was re-elected three successive times, being defeated after settling the much-disputed 3-cent fare fight in 1909. He had been in ill-health ever since his retirement from office.

HON. TOM L. JOHNSON.
From Photo Taken at Time of His Connection with Steel Business.

Personal

C. H. Todd, president of the Petroleum Iron Works Co., Sharon, Pa., has returned after spending two or three weeks in Mexico.

Harry Coulby, president of the Pittsburg Steamship Co., has returned to Cleveland after spending some weeks in southern California.

Charles G. Roebling, of John A. Roebling's Sons Co., Trenton, N. J., is spending some time in Los Angeles, Cal., and expects to return to Trenton about May 1.

L. Wolff, founder and head of the L. Wolff Mfg. Co., a large producer of sanitary ware and plumbing supplies, has returned to Chicago from Hot Springs, Ark., very ill. Mr. Wolff is 75 years old and has been suffering for some time from liver disease. Recently he has lost ground rapidly and decided to return to his home in Chicago.

R. W. Anderson, superintendent of the open hearth department, Colorado Fuel & Iron Co., Pueblo, Col., has resigned to become superintendent of the open-hearth department of the Pittsburg Steel Co., to take effect May 1.

Obituary

James A. Martin, proprietor of the City Iron Works, Middletown, N. Y., and one of the most prominent business men of that city, died April 7, aged 67.

Lenox Birckhead of Milwaukee, Wis., for many years general sales agent of the Bucyrus Co., South Milwaukee, died recently of apoplexy, aged 54. Interment was at Toledo, Mr. Birckhead's birthplace.

John G. Trimble, a well known civil engineer, and a member of the firm of Trimble & Miller, engineers, Pittsburg, killed himself April 4 by taking poison while a passenger on a street car. A nervous breakdown, the result of overwork, is said to have caused the act.

Henry F. Dimock, a prominent business man of New York City, died there April 10, aged 69. He was a director of the Dominion Iron & Steel Co., and of the Dominion Coal Co., president and director of the McCall Ferry & Power Co., and a director in numerous railroad and steamship corporations.

Senator Louis Joseph Forget, a leading financier of Montreal, died at Nice, France, on April 7, aged 58. Although he had been in poor health for some time, his death came unexpectedly. He was connected with several large corporations and was vice president of the Dominion Steel Corporation, in the affairs of which he took an active part. Until recently he was president of the Montreal Street Railway Co.

Henry Cribben, president of the Cribben & Sexton Co., stove founder, Chicago, died April 6 at his home in Oak Park, Ill., after an illness of several months. Mr. Cribben was born on the Isle of Man 77 years ago. His parents settled in Rochester, N. Y., while he was a child and he spent his youth in that city. He was in the stove business in Rochester and was at one time a member of the New York legislature. Mr. Cribben was one of the founders of the Stove Founders' National Defense Association, of which he was president for ten years, and he was also president of the National Association of Stove Manufacturers.

THE ABC OF IRON AND STEEL

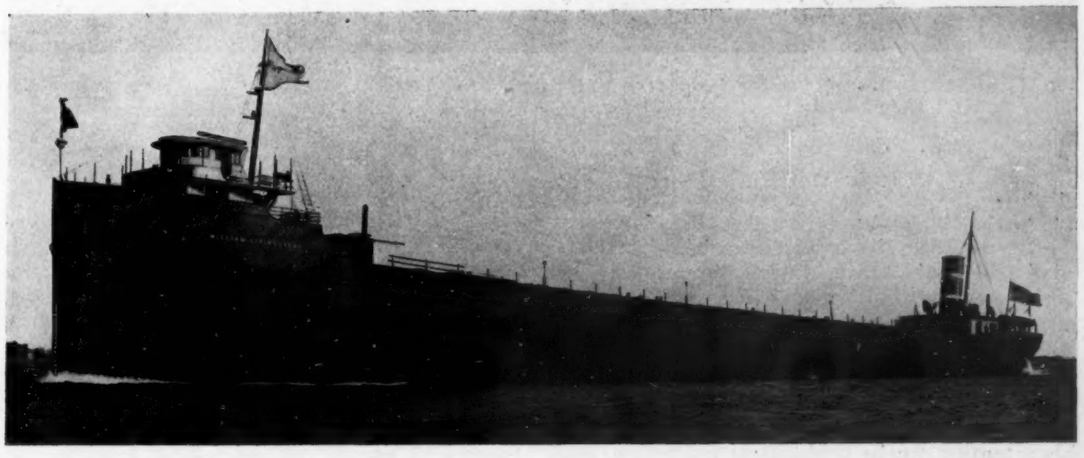
Transportation of Iron Ore on the Great Lakes—II

By Ralph D. Williams

THE ore docks at upper lake ports were being gradually enlarged to meet the requirements of the trade and, in passing, it might be said that no problem has been so resourcefully met as that of loading these ore carriers. The principle of loading is simple, that of gravity, but there are many important considerations involved in the construction of the dock. The foundation is frequently 40 feet below water level and consists of a series of piling that cannot have much cross-bracing until the surface of the water is approximately reached. Above the water there is a height of from 60 to 70 feet and on top of this is the enormous moving load of trains and locomotives, for an average of which 4,000,000 pounds is a low estimate. Air brakes on the trains stop them in a yard or two and consequently there is a pressure of about 2,500,000 foot-pounds to be taken up every time a train stops by the longitudinal bracing of the pier. Added to this is the fact that the center of permanent load may be 90 to 95 feet above foundation.

The earlier docks were constructed of timber exclusively, but concrete and steel enter largely into the construction of the modern types. As the ships have grown larger the docks have naturally grown higher and higher in order to give the necessary slope to the chute. Formerly, the base of the pockets was only about 20 feet above water, this being ample to give a sufficient incline to the chute for the ore to flow readily. In the more modern docks the hinge hold, however, is 40 feet and more, above the water level. In the height of the shipping season the handling of the ore trains is a problem of no mean order. The trains reach the docks on half-hourly schedules and it requires extremely rapid and bold manipulation to empty the cars into the pockets and make way for the next train. The problem is complicated by the fact that the ore in individual pockets cannot be mixed but must be of the same character, which involves shunting. The storage capacity of the docks is, of course,

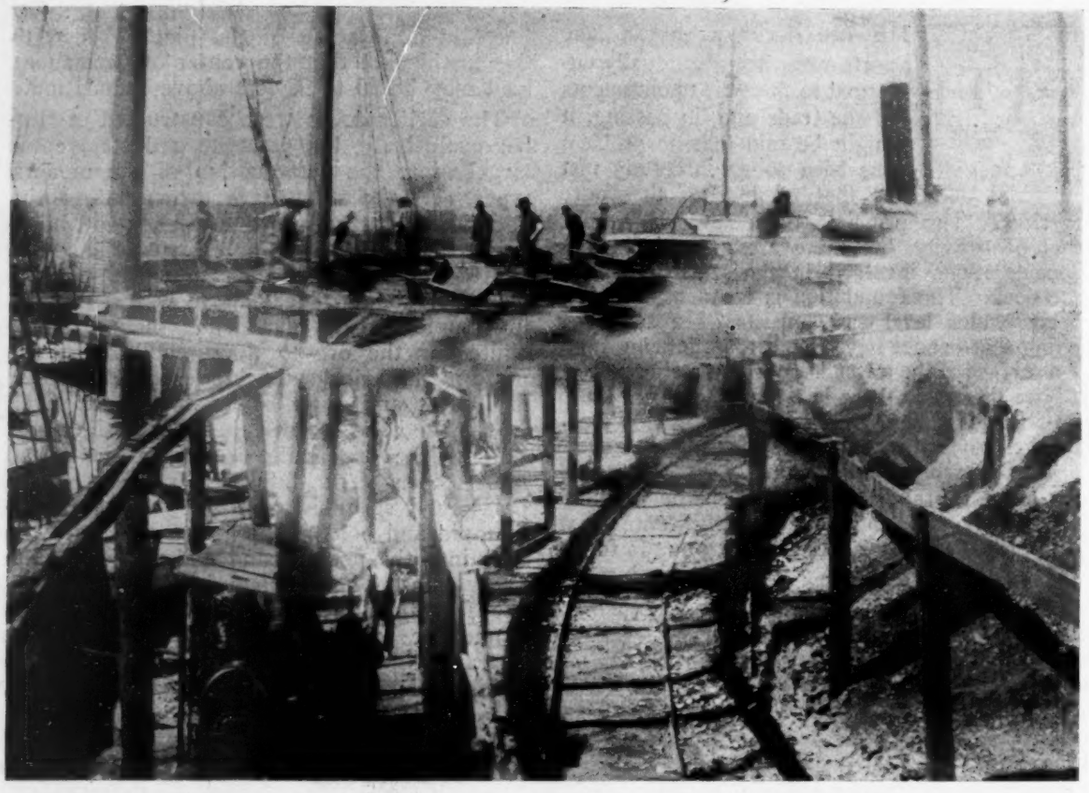
The following articles of this series have previously been published in THE IRON TRADE REVIEW: Iron Ore and Mining Operations, Jan. 5; Beneficiating Iron Ores, Feb. 2; Rules for Figuring Penalties and Premiums on Lake Superior Iron Ore, March 9; Transportation of Iron Ore on the Great Lakes—I, March 16.



STEAMER WILLIAM LIVINGSTONE, A REPRESENTATIVE TYPE OF THE GREAT LAKES ORE CARRIER; LENGTH, 552 FEET; BEAM, 58 FEET; DEPTH, 31 FEET; CARRYING CAPACITY, 10,000 GROSS TONS

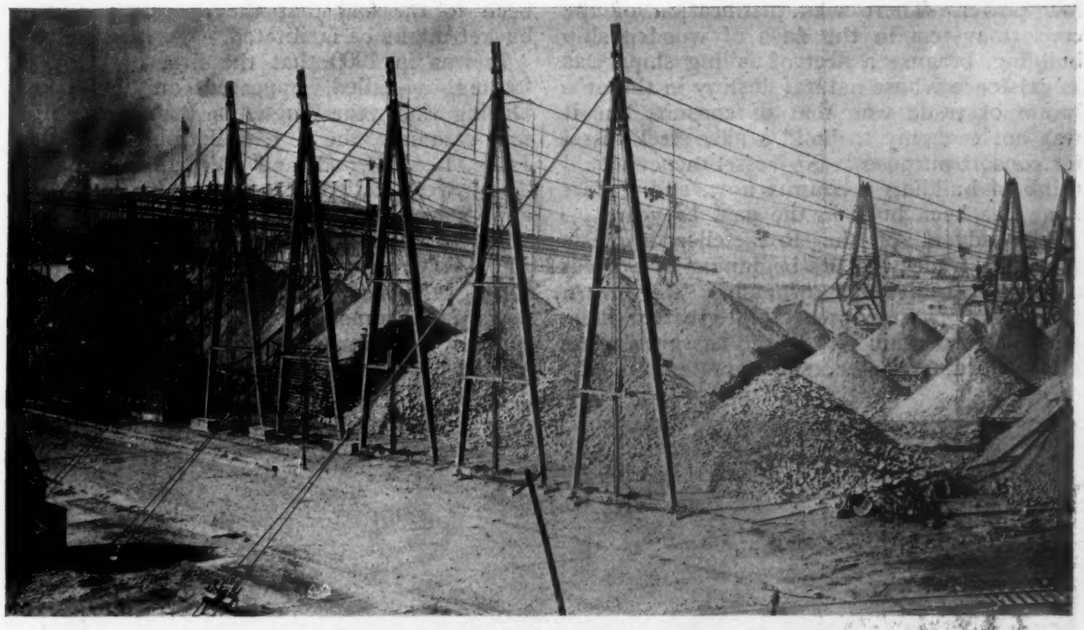
small when compared to their annual shipping capacity. There are now 25 ore-shipping docks on the lakes, ranging from 920 to 2,400 feet in length, the number of pockets ranging from 148 to 400. The dispatch obtained in loading is phenomenal. The steamer William E. Corey, of the Pittsburgh Steamship Co.'s fleet, loaded 10,111 gross tons of ore in 39 minutes, on Oct. 10, 1909, at Two Harbors, Minn. The loading began at 2:17 p. m. and ended at 2:56 p. m.

It is impossible to intelligently trace the growth of the lake freighter without noting the coincident development of the unloading machine, for the type of unloading machine has virtually dictated the type of steamer. As late as 1880 all vessels were being unloaded by wheelbarrows, little engines on the dock, as heretofore mentioned, hoisting the buckets out of the hold. In 1880, however, Alexander E. Brown, a young man of great inventive faculties, employed in the office of his father, Fayette Brown, one of the pioneers of the development of the iron country, turned his attention to the problem of unloading, and developed a single cable-wired rig which served the combined purpose of hoisting the bucket from the hold and conveying it to storage. This rig was installed on the N. Y., P. & O. docks at Cleveland, in 1882. The plant, as installed, consisted of five rigs with the machinery all in one house. The front pier of these machines was movable and they were the first movable pier cableways ever built in this country. They reduced the time of unloading remarkably, but naturally, as the tubs were small and had to be filled by hand, large hourly capacities could not be attained; but as ore could be taken from a number of hatches simultaneously by them, the time of unloading was greatly reduced.



THE FIRST MECHANICAL MEANS OF UNLOADING IRON ORE. THIS LITTLE ENGINE WAS INSTALLED ON THE NYPANO DOCKS AT CLEVELAND IN 1867 AND CONTINUED IN USE UNTIL SUPERSEDED BY THE BROWN HOIST IN 1882.

It is curious that the next step in the development of vessel tonnage should have been made by an interest quite alien to the lakes and without experience in ship owning, ship building or ship operating. During the panic of 1893, John D. Rockefeller had become, quite accidentally, perhaps, the owner of several iron ore deposits in the Lake Superior country, the output of which he contracted to deliver to the Carnegie Steel Co. upon certain terms. To win a profit from



THE SECOND ADVANCED STEP IN THE MECHANICAL MEANS OF UNLOADING IRON ORE AT LOWER LAKE PORTS. THE BROWN CABLE RIG IS SHOWN IN THIS ILLUSTRATION.

the transaction and to take advantage of the steadily deepening channels he gave orders through the Bessemer Steamship Co., in 1897, for a dozen vessels, some of them exceeding in dimensions any existing vessel, the largest being 475 feet in length. Thanks to this order more than half of all the steel tonnage built in the United States during that year was the product of lake ship yards. The result of this order was to throw a number of vessel owners into a panic, from which one at least has never recovered.

It is interesting to note that this order from the Bessemer Steamship Co. included two consorts, 450 feet in length, though in the early 90's the practice of building consorts began gradually to be abandoned. Vessel owners began to perceive that the highest economy of operation was reached by the single steamer of large carrying capacity and

THE THIRD METHOD OF UNLOADING IRON ORE MECHANICALLY AT LOWER LAKE PORTS. THIS ILLUSTRATION SHOWS THE BROWN TRAMWAYS

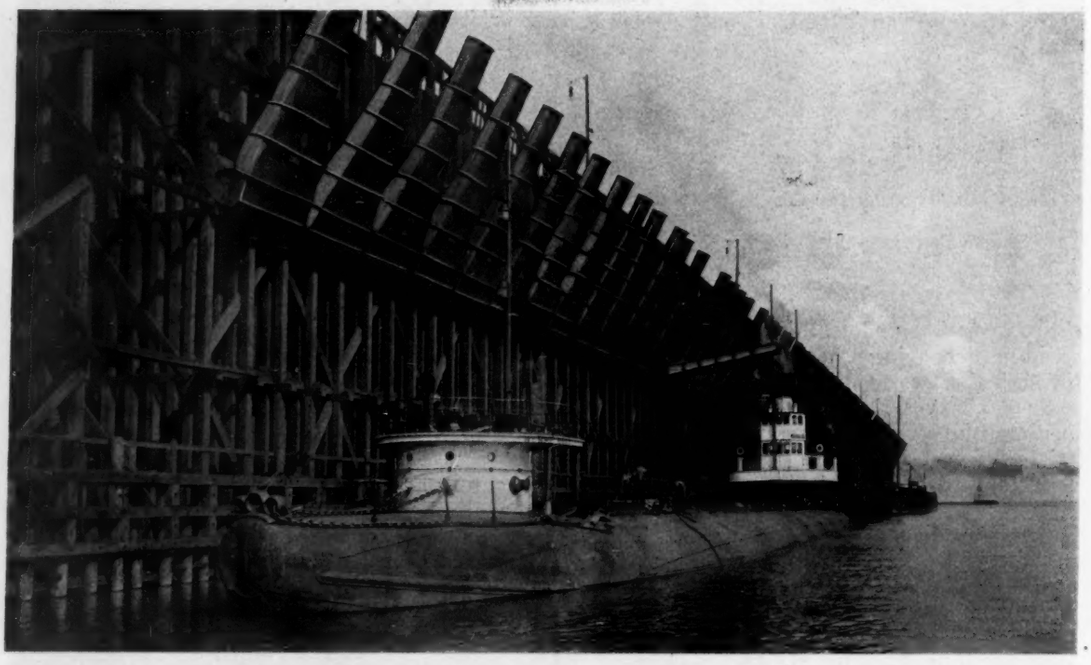
low power. There was justification of the consort system in the days of wooden ship building, because a fleet of sailing ships was in existence whose natural destiny in the evolution of trade was that of consort, but it was not economy to build a new steel vessel for consort purposes. No vessel owner would think of building a consort now, and in fact none has been built in the past 13 years.

The advent of the Rockefeller interests into lake trade was the beginning of a great change. Individual ownership has grown less and corporate ownership greater; independent ownership of tonnage has grown less and co-ordinate ownership greater. In the bulk freight trade, vessel owning as an independent business is diminishing, the vessel itself becoming a mere arm of some great ore-producing and iron-making interest. Coincident also with this change, and yet apart from it, have come mechanical developments that have revolutionized the trade.

In 1899, George H. Hulett induced the Carnegie Steel Co. to install on its docks at Conneaut, O., a new type of unloading machine operating a self-filling bucket. The introduction of a bucket that filled itself worked a revolution in lake practice and all the changes that have come about since have been to the end that the operation of this bucket might be facilitated.

It was in 1900 that the first of the 500-footers, so-called, appeared on the lakes. During that year Augustus B. Wolvin built four steamers, the J. J. Hill, John W. Gates, Isaac L. Ellwood and William Edenborn. They were called 500-footers because they approached it so nearly, being less than 2 feet short of 500 feet. This lead established by Mr. Wolvin was not followed, the tendency during the next two or three years being towards a somewhat smaller ship, approximating 450 feet in length. The facilities afforded by the new dock appliances, however, were gradually working an evolution in the type of bulk freighter.

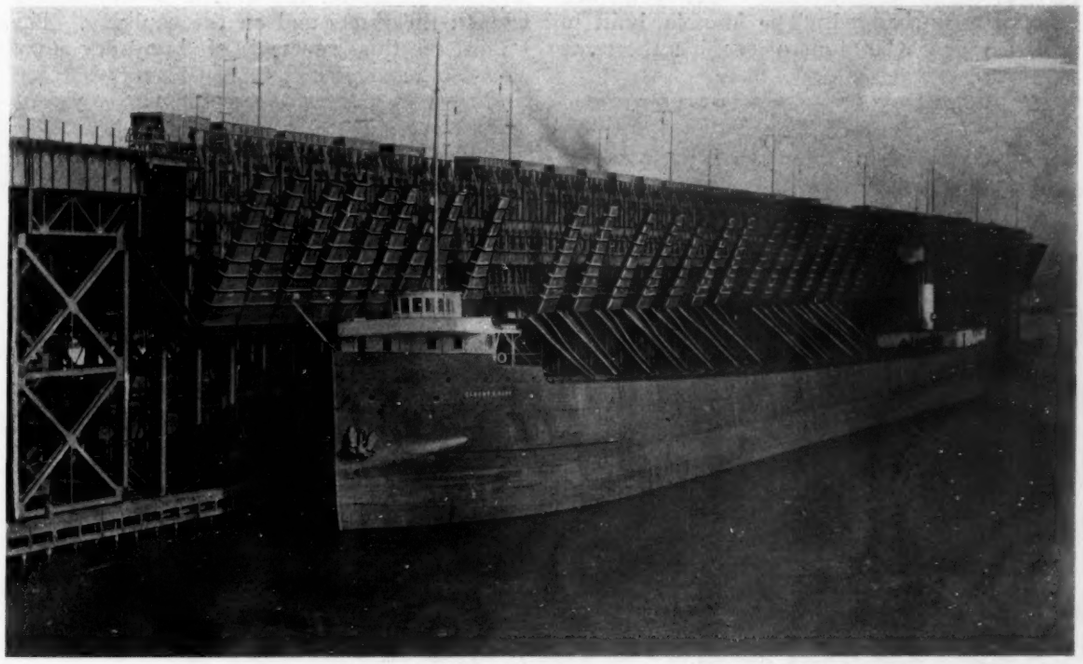
As stated earlier in this article, the ore pockets of the loading docks are spaced 12 feet centers. With hatches spaced 24 feet centers, the vessel obviously could receive its cargo from every other pocket simultaneously, and when the series of pockets was emptied, would have to make a 12-foot shift along the dock to be in line with the alternate series of pockets. In 1902, Mr. Wolvin built a steamer with hatches spaced 12 feet centers, thus making it possible to put a spout in every hatch simultaneously. This steamer



DULUTH & IRON RANGE RAILWAY CO.'S DOCK NO. 5 AT TWO HARBORS, MINN., LOADING THE WHALEBACK STEAMER HENRY CORT, OF THE PITTSBURG STEAMSHIP CO.'S FLEET

Dock No. 5 contains 168 pockets with a storage capacity of 35,450 gross tons. It is 10,050 feet long, 49 feet wide, 66 feet high from water line to deck of dock, and 39 feet high from water line to center hinge hole, with spouts 30 feet long.

was the James H. Hoyt. She was 376 feet over all and had 19 hatches. She took on her cargo of 5,250 tons in the record-breaking time of 30.5 minutes and discharged it at Conneaut under the Hulett machines in three hours and 52 minutes. Two years later Mr. Wolvin made the most prodigious jump that has ever been made on the lakes. In 1904, he built a steamer 60 feet longer than any other vessel on the lakes and departing radically in constructive features from the common type. This steamer was the Augustus B. Wolvin, 560 feet overall, 540 feet keel, 56 feet beam and 32 feet deep. Not only were her hatches, of which she had 33, spaced 12 feet centers, but her hold construction was novel. Main deck beams and stanchions were omitted entirely, compensating strength being secured by a heavy plate girder or arch across under the spar deck between each two hatches, connected to heavy plate webs running around the ship. Moreover, her tank top was bent up to meet the main deck stringer in the form of a slope, thus forming a continuous hopper. This hopper contrivance not only increased the water ballast capacity of the ship, but brought the ore cargo completely within the sphere of the unloading machines. This form of construction gave total freedom from hold obstruction and allowed the unloading machine free play upon the cargo. Moreover, it permitted the ore pile to be concentrated upon a small bottom area and, therefore, steep and high, affording the utmost convenience to the automatic bucket. The success of the Wolvin was instantaneous. She discharged her ore cargo of 9,945 tons at Conneaut in four hours and 30 minutes, four Hulett machines and four Brown machines working jointly upon her. Since that time every vessel on the lakes has been built on the girder system. Some have the girders straight, some of arch form; some have hopper sides straight instead of sloping, and some have no hopper at all; but none is now built on the old system with main deck beams and stanchions.



DULUTH & IRON RANGE RAILWAY CO.'S ORE DOCK NO.6 AT TWO HARBORS, MINN., LOADING THE STEAMER ELBERT H. GARY, OF THE PITTSBURG STEAMSHIP CO.'S FLEET. THIS DOCK IS CONSTRUCTED ENTIRELY OF STEEL AND CONCRETE

This dock contains 148 pockets, having a storage capacity of 43,246 gross tons. The dock is 920 feet long, 53 feet wide, 73 feet high from water line to deck of dock, and 40 feet high from water line to center hinge hole, with spouts 32 feet 4 inches long.

The old order of things has entirely passed away. Old vessels were scrapped or altered or forced into other trades and vessel owners deluged the ship yards with orders for vessels of the new type. The Pittsburgh Steamship Co., through Harry Coulby, president and general manager, gave orders to the American Ship Building Co., for four vessels, to be 9 feet longer than the Wolvin. They were the Elbert H. Gary, William E. Corey, Henry C. Frick and George W. Perkins. Scarcely had

they been built before he placed orders for eight ships to be 600 feet over-all, the J. Pierpont Morgan, H. H. Rogers, P. A. B. Widener, Norman B. Ream, Thomas Lynch, George F. Baker, Thomas F. Cole and Henry Phipps. Moreover, the beam was increased to 58 feet. In fact, since 1904, lake ship yards have received a virtual avalanche of orders for vessels of the new type, varying in length from 524 to 600 feet over-all. In 1905, 29 such bulk freighters were built; in 1906, 40; in 1907, 40; in 1908, 24; in 1909, 17, in 1910, 26.

The running expenses of these very large ships are very little more than those of the old boats, practically the same crew being carried. The engines also have remained practically unchanged. The Manola, built in 1890, carrying 3,000 tons of ore, has the same machinery as the Gary, built in 1905, carrying 10,000 tons of ore. In comparison to their size, these bulk freighters are obviously of very low power, but nevertheless sufficient for the purpose. The triple-expansion engine as installed on these ships has probably reduced economy to its least dimension, consuming 55 hundredths of an ounce of coal per ton mile of cargo carried.

Notwithstanding this low power, the way the ships are maneuvered in the narrow and crooked channels is a marvel of skill. They approach the loading and unloading docks with the silence and caution of an Indian in his canoe. Care of course has to be exercised both in loading and unloading these great carriers to see that the ship is not unduly strained. The increase from 3,000 to 13,000 tons in carrying capacity and from 300 to 600 feet in length has made the distribution of the load a matter of the very greatest importance. The modern bulk freighter, with machinery aft and deck-house in the forecastle, has, when loading equally between these two points, a natural tendency to sag amidships, due to the fact that there is an excess of buoyancy at both bow and stern, particularly at the bow, where there is a long empty space with practically no weight except that due to the windlass, chain and anchors. When the vessel is unloaded these conditions are reversed, there being an excess of buoyancy amidships. Naturally, this continued reversal in the direction of the straining force on the hull is a very severe test on the rivets and on the caulking. The strain of this reversal of buoyancy over weight can be minimized in degree by the exercise of care in the distribution of the cargo. Approximately 36 per cent of the total cargo should be carried in the forward third of the cargo hold, about 30 per cent in the midship third and 34 per cent in the after third. In unloading, care must be exercised to take the cargo out in fairly even proportions. In lake practice the loading and unloading of the bulk freighter is under the direct supervision of the mate, who certainly has a busy time of it. The care of the ship is not the dock man's concern, and unless the mate is alert the cargo may be unequally loaded and unequally discharged. The dock men are likely to drop more ore into a compartment than the ship should carry there or to take it out unequally. Eternal vigilance

GENERAL VIEW OF THE DULUTH & IRON RANGE RAILWAY CO.'S ORE DOCK NO. 6 AT TWO HARBORS, MINN.

These great ore docks, of which there are 25 on the American side, have but slight storage capacity in proportion to the enormous volume of ore which they annually ship. The ore, in fact, remains in the pockets but a few moments, sometimes not at all, passing directly from the car through the pockets into the vessel. In the height of the shipping season, trains thunder down upon the docks from the mines in half-hourly schedules and it requires great boldness and skill to handle these rapidly moving cars, discharge them and make way for the next train. The dispatch obtained in loading at these docks is almost incredible. The steamer Wm. E. Corey, of the Pittsburg Steamship Co.'s fleet, loaded 10,111 gross tons in 39 minutes at this dock on Oct. 10, 1909.

is the price the mate has to pay to insure his ship from straining.

Coal is free in and out of the boat, but the vessel has to bear the unloading charge on ore. For several years this charge had been 20 cents a ton, but in 1910 was reduced to 15 cents. The vessel owner pays this charge out of his freight rate, which during 1910 was 70 cents from the head of the lakes. Figures as to the actual cost of unloading ore are not easy to get, but there is undoubtedly an enormous profit in the business even at 15 cents per ton. As the machines have increased in efficiency, the actual cost of unloading has, of course, been reduced. When vessels were unloading by wheelbarrows it was estimated that it cost 50 cents per ton to unload them; when the first Brown hoisting and conveying machine was installed on the docks at Cleveland it was estimated that it had reduced the actual cost of unloading to 18 cents per ton, and there is every reason now to believe that the actual cost with the clamshells is less than 5 cents per ton.

In the general prosperity of the country, cheap transportation on the lakes has been a factor of prime importance. It is, in fact, responsible for the supremacy of the United States as an iron and steelmaking country. Were the waters of the lakes dried up, no railroad or system of railroads could hope for a moment to handle its traffic. It would simply cease to exist. The great iron and steel plants of Ohio, Pennsylvania and the central west would close and thousands of allied industries would be abandoned. Three-quarters of all the ore used in the furnaces of the United States comes from the Lake Superior country. These deposits are one thousand miles away from the coke and limestone. Were it not for these lakes there would be no possible means of assembling the ore, the coke and the limestone to equal the furnace cost of those countries where the ore and coal lie in contiguous hills. No railway in the United States is better equipped to move freight than the Lake Shore because its grades are light and its roadbed unsurpassed, yet the rate per ton mile for moving freight on this railroad during 1909 was 5.16 mills. The rate per ton mile of moving freight on the great lakes during 1909 was 0.78 of a mill. A ton of ore is moved a thousand miles on the great lakes for seven-tenths of a mill per mile. A ton of ore is carried from Duluth to Buffalo at a rate but little in excess of the ordinary railroad switching charge in any of the large cities. A ton of coal is carried from Cleveland to Duluth for what the ordinary householder pays to have it carried from the sidewalk into his cellar.

Being full and flat, virtually great oblong boxes, these bulk freighters of the lakes do not gratify the eye like the finely modeled ocean liners, but as capacious and economical beasts of burden they are unrivaled. They are a peculiar evolution to meet a peculiar condition and they have met it magnificently. For the rapid handling of material in bulk no floating structure could be simpler or more resourceful.

The wonder of lake transportation is the suddenness of it, since it is but little more than half a century old and its beginnings are well within the memory of men still living. Scarcely more than 50 years ago all the commerce of Lake Superior as well as all the ships that carried that commerce, could be safely stowed in the hold of any one of the steamers now engaged in that trade, and yet there are so many vessels now employed in that trade that over a waterway of 1,000 miles long one vessel is rarely out of sight of another. Witness the ore laden fleet as it passes out of Duluth harbor; follow it a little down the lake until it joins the squadron emerging from Two Harbors, to be joined by a third defiling from Ashland. Eastward they sweep, uniting with the old guard at Marquette, bearing down upon the Sault in a mighty throng, struggling the imagination to believe that they are plying waters that knew only the birch bark canoe scarcely half a century ago. Ask what genii is it that has rubbed Aladdin's lamp to such purpose and the answer is iron. Onward they sweep and debouching into Lake Huron join another detachment coming through the Straits of Mackinac from Lake Michigan. Down Lake Huron they continue, a vast and ever-growing procession, closing in at Port Huron for the passage of the straits. Then the great parade moving steadily onward enters the Detroit river. It is no state occasion that one beholds, but the common business of the day. Seventy-five million tons are passing in review, over forty millions of it being iron ore, to be worked up by countless hands to do service to mankind in innumerable ways. This transfer of the red, brown, blue and purple earth of the Lake Superior mines to the furnaces of the Ohio and Pennsylvania valleys has created greater wealth and distributed its blessings more widely among people of the United States than any other agency. There is not a man, woman or child living in this country who is not in some degree the recipient of its beneficence.

Steel Manufacture in an Electric Converter

A New Method of Making Steel Which Combines the Best Features of the Basic Bessemer and Electric Processes

By Albert E. Greene

Electric furnace processes in steel manufacture have heretofore been used largely for the production of high-grade steel, and have not been considered competitors of the Bessemer and open-hearth processes for making ordinary grades of steel. The object of this paper is to discuss certain characteristics of the processes commonly employed for making ordinary steel, and thus to lead up to the consideration of a new electric furnace process which, by reason of improved economy of metal, bids fair to take a place of prominence in the development of a successful competitor of the Bessemer and open-hearth processes. The characteristics of these old processes, to which attention is particularly called, are the unavoidable losses of metal incident to such steel processes and the chemical reactions responsible for the great losses that occur.

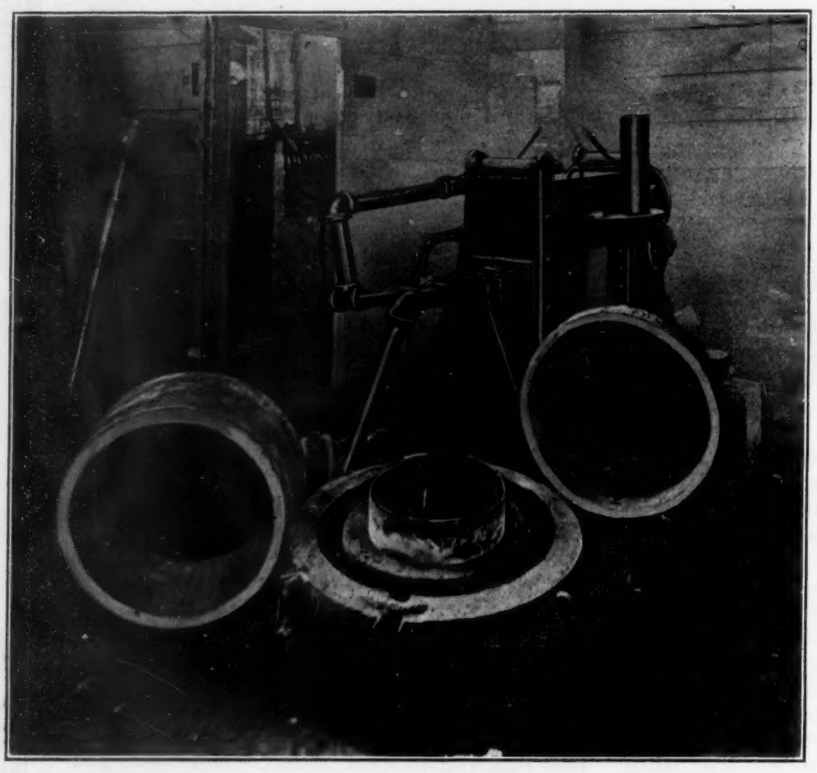


FIG. 1—THE ELECTRIC CONVERTER IN OPERATION. THE REPLACEABLE SHELL IS SHOWN IN THE FOREGROUND.

In the Bessemer process alone, the loss of metal by undesired oxidation, vaporization, etc., amounts according to some authorities to half a million tons per annum, assuming a total production of ten million tons of Bessemer steel. In the acid Bessemer process, as practiced at many places in the United States, the decrease in weight of the charge during the conversion process is at least 10 per cent of the weight of the pig iron charged; about one-half of this decrease in weight results from the elimination of carbon and silicon; the remaining one-half, a sheer loss of metal. In short, in the conversion of pig iron into steel by the Bessemer process there is a loss, which is so much waste, which approximates 4 or 4.5 per cent of the total weight of the charge in iron and practically all of the manganese, which latter approximates ½ per cent, and making a total unavoidable loss of about 5 per cent of the weight of the charge in these two metals. Harbord gives the yield of metal in the acid Bessemer plant as 86 to 88 tons of ingots per 100 tons of metal used, and in the basic Bessemer only 83 tons of ingots.

Losses in Side-Blown Converters.

In the operation of small, side-blown converters the decrease in weight during the conversion process probably averages over 18 per cent and the greater loss is due to the increased length of blow, which gives the oxygen more opportunity to oxidize the metal. In the basic Bessemer process, even in large vessels, the loss in weight is also very high,—according to some authorities, 15 per cent; and the basic open-hearth, although considerably better in this respect, is itself open to the same criticism. A somewhat misleading fact in connection with the open-hearth process is that the yield is often based on the weight of metal charged without taking account of the ore used which remains unreduced in the slag. One sometimes hears of open-hearth furnaces with an efficiency of 101 or 102 per cent. Some authorities give the amount of iron lost in open-hearth slag as 2.5 per cent of the weight of steel made, and the loss of manganese as 0.5 per cent. For the 16,000,000 tons of open-hearth steel made per annum in this country this loss of both iron and manganese would amount to 480,000 tons, and the total loss from all processes would approximate 1,000,000 tons per year.

Reactions of Bessemer Process.

It is well known that at the initial temperature of the Bessemer blow, (1,250 to 1,300 Cent.) the oxygen of the air blast attacks the silicon of the charge more strongly than the iron or the carbon. This oxidation of silicon produces a large amount of heat, sufficient to raise the temperature of the bath of iron several hundred degrees, at which latter temperature the affinity of oxygen for carbon becomes greater than its affinity for silicon. This relative change of affinities of silicon and carbon takes place at a certain definite

[1]Read before the American Electro-Chemical Society in New York, April 8, 1911.

temperature, probably about 1,425 degrees Cent. After the carbon is eliminated the metal is poured into a ladle and spiegeleisen, containing about 15 per cent of manganese and about 4.5 per cent of carbon, is added. This addition serves two purposes: It deoxidizes the steel, since a portion of the manganese in the spiegel unites with the oxygen in the metal and rises as a slag; and second, it brings the composition of the steel up to specification in manganese, carbon and silicon. The basic Bessemer process differs from the acid process in that the former eliminates phosphorus, whereas the latter does not.

Oxidation of Impurities.

In the several modifications of the Bessemer and also in the open-hearth process it is noted that the different impurities show different tendencies to oxidize under different conditions. Silicon is usually the first element to oxidize and manganese has about the same tendency. The affinities of different elements for oxygen vary with the temperature; as the temperature rises above what is called the critical temperature for silicon and carbon, the relative tendency of the two elements to oxidize is reversed and the carbon has preference. The point of temperature at which this change occurs may be readily ascertained in the operation of the Bessemer process by the appearance of the carbon flame. The affinity of phosphorus for oxygen

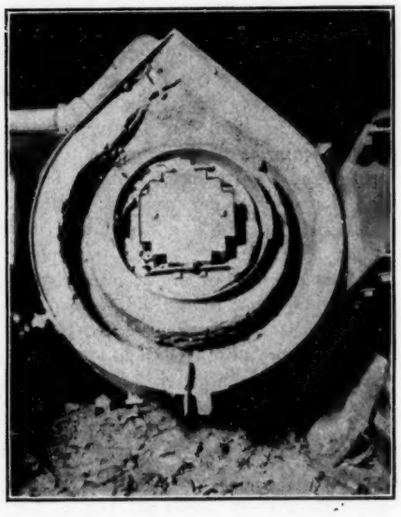


FIG. 2—COVER OF ELECTRIC INDUCTION CONVERTER REMOVED AND LINING BROKEN AWAY TO SHOW TUYERES.

at high temperatures is less than that of carbon and greater than that of iron, but we find that the relative affinity of phosphorus for oxygen varies very considerably also.

In the Monell and similar processes, in which the phosphorus is oxidized out at pig iron temperatures, the phosphorus has at such temperatures a greater affinity for oxygen than either carbon or iron, and under such conditions oxidizes out first. It is a fact, however, that in the practice of the Bessemer and open-hearth processes in the various modifications more or less of all the elements are oxidized, although some one element usually has a marked preference for the oxygen. It has been suggested, as a theory to explain this preferential action of the oxygen on some one element, that while several elements are oxidized, the one having the greatest affinity for oxygen robs the others of most of the oxygen they may have taken up. It is evident at least, that the different elements present in pig iron have quite different tendencies to oxidize at different temperatures and that the preferential oxidation may be more or less controlled in the ordinary processes by controlling the temperature. Thus, if we desire to oxidize silicon first, it is necessary to keep the temperature low, probably below 1,425 degrees Cent. I give this particular temperature from results of my own experiments, never having seen it published. Numerous means have been proposed to do this, such as the use of carbon dioxide as oxidizing agent, since carbon dioxide takes up a large amount of heat in splitting up and thereby cools the bath. But the use of such an agent does not prevent the partial loss of the alloying metals, since the carbon dioxide is an oxidizing agent with respect to both the carbon and the other elements present. If it is desired to oxidize carbon first from a bath of pig iron it is necessary to maintain the temperature above the critical temperature and it was proposed early in the history of electric furnaces to do this in an electric furnace and simultaneously blow the bath with some oxidizing agent. It was even proposed to use gases containing carbon dioxide in an induction heated

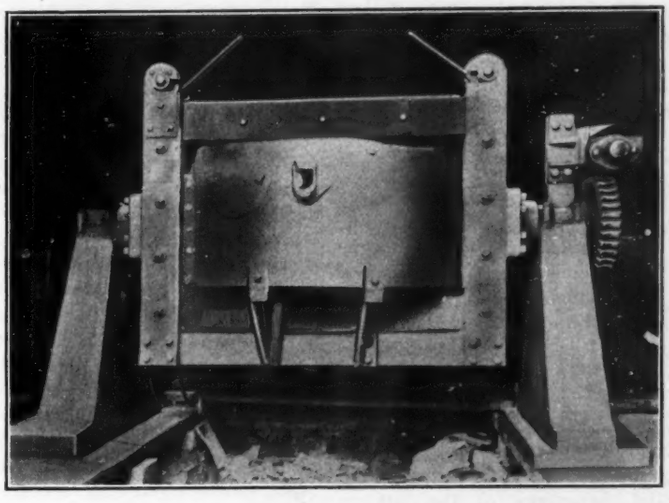


FIG. 3—ANOTHER VIEW OF THE ELECTRIC CONVERTER

furnace, as early as the '90s to refine iron.

It is a most interesting fact that much of our iron ore contains the elements, manganese and silicon, in sufficient quantity to meet the specifications of ordinary steel, and moreover, these elements are reduced in the blast furnace and are almost invariably present in the pig iron in sufficient quantity to meet requirements without any additions, were it possible to save them in the convertor; but during the convertor blow the silicon and manganese are practically all eliminated and then these alloying metals are put back again by charging into the steel some expensive alloy additions. It costs to reduce these elements in the blast furnace, in coke, labor, etc., and it costs to replace them again after they are oxidized. The value of the manganese is quite important. If the nine million tons of Bessemer steel produced in this country last year was made from iron containing 0.5 per cent or more of manganese, 0.4 per cent of which is lost in conversion, the total weight of metallic manganese so lost would have amounted to 36,000 tons; and if specification required 0.5 per cent manganese and 0.1 per cent had remained in the iron, there would have been added to the blown steel enough spiegeleisen to give this. It would have required more than 225,000 tons of spiegel containing 16 per cent manganese if there were no loss in making the addition; but there is a loss of manganese which probably exceeds 25 per cent of that retained.

The total loss of manganese including this 25 per cent loss would have been 45,000 tons. The actual total loss for both Bessemer and open-hearth processes is probably far in excess of this. Now if this wasteful oxidation can be prevented, it will not only make the costly additions unnecessary, but more steel will result from the same quantity of pig iron. There is undoubtedly a chance here to apply the principles of conservation to our metal industry.

New Process.

I wish to point out how the electric furnace in combination with a control of chemical reactions by regulating the gaseous agents, provides a means of producing metal of higher grade and of doing it more efficiently and with far less loss than is possible in Bessemer or in open-hearth furnaces, and to describe a new process which takes advantage of a combined control of temperature and gaseous reagents to accomplish such a saving. The chief advantage of the electric furnace does not consist simply in its ability to produce extremely high temperatures, but rather in the fact that it provides a means of maintaining a charge at any given temperature, thereby enabling one to control the composition of the atmosphere at will. In this connection it will be of interest to consider the meaning of the term *neutral* as commonly applied to the atmosphere within furnaces in general, including electric furnaces. *Neutral* means inactive, but the atmosphere, if of proper composition, may react in such a way as to greatly aid a metallurgical process; for instance, the atmosphere in a steel-producing furnace might be reducing toward iron oxide and prevent the steel from oxidizing; or it might be oxidizing toward carbon or phosphorus and thereby eliminate them. Now, it is a most interesting fact that we can have an atmosphere which is reducing with respect to iron oxide and nevertheless oxidizing toward carbon or toward phosphorus. For this reason it seems to me that the term *neutral* and also the term *non-oxidizing* is very indefinite, where there are different elements present, unless it is stated with respect to what the atmosphere is neutral or non-oxidizing.

Elimination of Carbon.

I have made the statement that it is possible to have an atmosphere which simultaneously is reducing toward iron oxide and oxidizing toward carbon. The principle underlying that fact is the basis of a new process for oxidizing carbon out of iron without oxidizing the metal itself. The conditions under which such reactions might theoretically be carried out are well worth considering. If molten pig iron be placed in a closed crucible, made of magnesite for instance, and kept at a uniform high temperature, and the space above the iron in the closed crucible filled with carbon dioxide gas, the gas and iron will react and finally come to a state of equilibrium, the reaction might be represented as follows: $CO_2 + Fe = FeO + CO$. Under the equilibrium conditions which would be reached the ratio of the amounts of the two gases present would have a given value for the particular temperature. If we then replace the mixture of these two gases by another mixture containing relatively more carbon monoxide and less carbon dioxide than the equilibrium mixture, and allow this new mixture to react with the iron and the iron oxide, some of the FeO would be reduced and the CO_2 component of the gas increased. This replacement could be made continuous by successive introductions of the new mixture. In this way reduction of iron oxide could be carried practically to completion, and moreover, this could be done by means of a gas containing an oxidizing agent for carbon.

Early Experiments.

This was the theory on which the American Electric Smelting & Engineering Co. started in its experiments several years ago to develop a practical process for converting pig iron into steel and refining it without oxidizing the iron and other valuable constituent metals. An extensive series of experiments has been carried out. The first experiments were made in small, electrically-heated, magnesite crucibles holding only a few pounds at a charge. Pig iron and various other metals were treated at different temperatures with various mixtures of oxidizing and reducing gases for the purpose of ascertaining what ratio of reducing gas must be present to prevent oxidation. Almost pure carbon dioxide gas was used in some instances; and carbon monoxide gas in another and then in others, various mixtures of such gases were used. It was found that a wide range of composition would still accomplish the desired results.

It was found that producer gas might easily be made to serve the purpose, and that a producer gas containing as little as 4 per cent of carbon monoxide and as much as 15 per cent of carbon dioxide would, when blown into molten pig iron at a temperature of about 1,450 degrees Cent., eliminate the carbon with practically no oxidation of iron, manganese or silicon. After carrying out a series of tests in these small electrically-heated crucibles, and finding it practical to separate different elements such as carbon, phosphorus and silicon from iron without material loss of the other elements which it was desirable to retain, we employed an induction heated vessel of about 300 pounds capacity to test the process on a practical scale. This furnace had an enlarged portion at the back forming a pot and tuyeres were put into this part in much the same way as they are put in Tropenas converter. Fig. 1 shows this small furnace.

Operation of the Furnace.

The process consists of providing a bath of molten low phosphorus pig iron containing, for example, the usual proportion of manganese, silicon and carbon, leaving out of the question for the moment the removal of phosphorus and sulphur. The charge preferably contains sufficient manganese and silicon to slightly more than meet the specification for the particular steel to be made. The temperature of the bath is raised to something over 1,425 degrees Cent. and, while it is maintained by the electric heat, a gaseous mixture containing carbon monoxide and carbon dioxide is blown into the metal in much the same way as air is blown into a Tropenas convertor. This mixture may contain 12 to 18 per cent of CO_2 and 5 per cent of CO, or more.

Rate of Eliminating Impurities.

The rate of elimination is a little slower than with the Bessemer process for the same rate of blowing. A well-operated, side-blown convertor requires from 25 to 35 minutes to make a blow, using about 1,500 cubic feet of gas per minute per ton of metal. In this small induction furnace, using about 50 cubic feet of gas per minute per 200 pounds, or about one-third the rate of blowing in the side-blown Bessemer vessel just referred to, the carbon can be eliminated in something more than an hour and one-half, depending on how much carbon there is at the start. Thus, with only one-third as much gas blown per unit weight of metal, the time is a little more than three times as long as for a similarly blown vessel using air. By increasing the rate of blowing the time can be greatly cut down. We carried out tests to determine the minimum time under best conditions of contact of gas and metal and found that it was possible to eliminate the carbon in 18 minutes without oxidation of the metal. The rate of elimination depends largely on the contact of the gas with

the metal and when the gas is blown through the metal it is most rapid.

It was found that the gas could be blown into the metal without any formation of slag on the surface of the metal and without any boiling. If an oxide slag had formed before the blow, as might happen when rusty scrap is melted to make up the charge, we found it possible to practically completely reduce this iron oxide during the blow simultaneously with the removal of carbon. In this small furnace pig iron can be converted into steel with as small a loss of iron and manganese as 2.5 per cent, including losses in charging and spills in handling the steel. In view of the difficulty of handling molten steel in such small quantities as only 200 pounds without losing a few pounds this loss seems extremely low. In small Bessemer vessels holding as little as 300 pounds the loss of metal is said to be not less than 20 per cent, aside from the loss of weight by oxidation of carbon.

Slight Loss of Manganese.

The most convincing evidence that oxidation does not take place in this process may be found in connection with the loss of manganese. In converting a 13.4 per cent spiegel containing 13.4 per cent manganese, into manganese steel, we have done this without any additions of any kind and have produced a steel containing over 12.5 per cent manganese and this was without the use of a slag to prevent vaporization. The carbon was reduced from over 4 per cent to 1.20 per cent. In later tests, using a lime slag, the loss has been further diminished.

It is well known that the high percentage of carbon present in commercial ferro-manganese makes it practically impossible to obtain as much as 12 to 14 per cent of manganese in manganese steel without raising the carbon content above 0.9 or 1 per cent. No great difficulty is met with in producing very low carbon manganese steel by the process described.

With regard to the quality of steel made the objection has been raised by steel makers that steel made without additions and by retaining part of the original content of such elements as manganese and silicon, will not be sound; but we have demonstrated that in this process the metal can be made absolutely sound and free from blowholes and of as good quality as other electric furnace steel.

Reference has already been made to the conversion of spiegeleisen into manganese steel. The process can be very usefully applied also to making manganese steel from pig iron and manganese steel scrap. In carrying out this application of the process, molten pig iron is charged into the converter and the scrap is melted into the molten iron, meanwhile keeping a small amount of gas passing through the furnace, which prevents oxidation of manganese and aids decarbonizing. After melting the scrap into the molten iron the temperature is raised to about 1,450 degrees Cent. and kept there and meanwhile the bath is blown with the gas. The percentage of carbon may be regulated by stopping the blow when enough has been taken out and in case it is desirable to remove silicon this may be done by charging a lime slag on the bath. Of course, where the charge consists in part of iron or steel low in manganese, ferro-manganese is added to raise the manganese to the desired per cent. After the composition is attained, the temperature is regulated and the metal poured. The power consumption for melting manganese steel scrap into molten pig iron need not be more than 500-kilowatt hours per ton, and at a cost of 1 cent per kilowatt hour, the power cost would not amount to more than $5.00 per ton. The value of the manganese which can be saved is considerably in excess of this.

Such application of the process as just described is suitable for utilizing any kind of alloy steel scrap, such as armor plate and tool steel scrap, not only cutting down losses and additions, but producing a higher grade of product.

Production of High Grade Steel.

Let us consider the application of the process to the removal of phosphorus and sulphur and to the production of a high grade steel from low grade pig iron in one continuous process; and for the sake of comparison let us consider the basic open-hearth and basic Bessemer processes for removing these elements. The chemistry of these processes is not altogether clear. Lime is necessary to hold the oxidized phosphorus out of iron after it has been oxidized, but the presence of iron oxide has been considered more or less essential. In the open-hearth process, and also in the electric process the iron oxide is present as ore or scale; in the basic Bessemer it is formed by the action of the air on the iron and this is supposed to combine with the phosphorus. Thus the phosphorus is held in the slag as an iron-calcium phosphate. Another interesting fact about phosphorus is that it can be oxidized either before carbon or after carbon. If the temperature of the iron is low, say about 1,300 degrees Cent., phosphorus may be oxidized very rapidly and with very little oxidation of carbon. This action usually takes place after the silicon has been nearly all oxidized; on the other hand, in the basic Bessemer converter, phosphorus is the last thing to oxidize and does so only at high temperature.

Removal of Phosphorus.

The process described for oxidizing carbon without oxidizing iron is similarly applicable to the removal of phosphorus. We have found that we can oxidize phosphorus out of iron and hold it out by means of lime and do this with practically no oxidation of iron and little manganese. We have done this at pig iron temperatures below 1,350 degrees Cent. without oxidizing carbon, and we have done it at high temperatures, above 1,500 degrees and up to 1,900 degrees Cent. after carbon has been oxidized. We also found that the sulphur can be taken up and held in this same slag that holds the phosphorus, which action we attribute to the absence of oxide of iron in the slag.

We have converted a low grade pig iron into a high quality steel in one continuous operation in this way, taking out the carbon without oxidation of iron and manganese and then, with a lime slag on top of the metal, by continuing the blow of the gaseous mixture, the phosphorus has been oxidized and eliminated. The phosphorus was found combined with the lime as calcium-phosphate and practically all the sulphur was found in the slag as calcium-sulphide.

We have had such results as follows: Analysis of charge, phosphorus, 0.76 per cent; sulphur, 0.113 per cent; analysis after blow, phosphorus, 0.026 per cent; sulphur, 0.040 per cent; analysis of charge, phosphorus, 0.094 per cent; sulphur, 0.040 per cent; analysis after blow, phosphorus, 0.008 per cent; sulphur, 0.017 per cent.

We have carried out such a conversion of molten pig iron into refined molten steel, as just outlined, in less than 30 minutes, which indicates that the reaction takes place quite rapidly and that the problem of installing the process in vessels of ten or more tons capacity is a mechanical one of getting the gas into the metal.

It may be of interest to compare the operation of making steel castings in a small plant using a side blown Bessemer converter and in one fitted with an electric converter using this process.

In the Bessemer plant, molten, low-phosphorus pig iron is poured into the converter and blown until the carbon is practically out. The vessel is acid-

lined and no phosphorus or sulphur can be removed, so that the highest quality of iron must be used. This grade of iron usually contains about 2 per cent of silicon and 0.5 to 1 per cent of manganese. As already stated, the total loss of weight during the conversion often averages 18 per cent and as much as 12 or 13 per cent of metallic iron may be oxidized. In a small plant, recarbonizing and deoxidizing is usually done by adding ferro-manganese and ferro-silicon in the ladle and even in this part of the process there is a further loss due to the oxidation of these alloys in entering the steel.

Side-Blown Converter Metal Losses.

To get some idea of the value of the metal lost by oxidation, consider a small plant making, say 20 tons of castings per day from 32 tons of molten steel and converting about 39 tons of molten pig iron per day to make the 32 tons of molten steel. Of the seven tons loss, about five tons is metallic iron. The loss per year of 300 days would be 1,500 tons. If this metal had been saved as steel its value, at $30 per ton, would be $45,000. Such a loss is clear waste. Besides the iron there are other losses. Suppose the specification requires 0.60 per cent manganese; the cost of the 80 per cent ferro-manganese required to give 0.60 per cent manganese in the steel might easily be 45 cents per ton of steel or $4,320 per year. Practically one-third of the weight of ferro-manganese in the steel is lost in slag.

If it were possible to eliminate carbon without eliminating manganese it would be very simple to use a pig iron containing sufficient manganese to meet final steel specifications and not only would it be possible to dispense with the ferro-manganese additions, costing about 45 cents per ton of steel, but the 0.6 per cent of manganese saved would mean 0.6 per cent more steel from the same weight of pig iron. It is by the saving of such metal that we believe the increased cost of the electric converter process will be much more than justified.

Use of High Phosphorus and High Sulphur Irons.

Before leaving the small Bessemer plant there are other facts to be considered, especially those relating to the phosphorus and sulphur. There is a very considerable difference in the price of low phosphorus iron and Bessemer iron. If Bessemer iron containing, say 0.09 per cent phosphorus could be used instead of iron containing less than 0.04 per cent phosphorus, there would be a saving of several dollars per ton over the higher grade iron; if still lower grades of iron, containing more phosphorus, could be used, the difference in cost would be much more marked. As is well known, it has been proposed to combine some form of electric furnace with an acid-lined convertor and, after blowing the metal in the convertor and eliminating silicon and carbon, to transfer it to the arc furnace and there dephosphorize, desulphurize and deoxidize it. Such a combination process using an arc furnace, the Heroult or the Girod furnace for example, has important advantages, especially in respect to the quality of steel which it is possible to produce. It is the opinion of some well-known steel men, however, that such a combination is not adapted to the refining of high phosphorus and high sulphur iron and that the cheapest method of refining such low grade iron is in the open-hearth, finally giving the refined steel a finishing treatment in an electric furnace.

Slagging Operations.

Probably one reason for this opinion is that electric furnace refining requires two distinct slagging operations, the first, an oxidizing slag similar to a basic open-hearth slag; and the second, a reducing or deoxidizing slag replacing the first one. The action of the first one differs little if any from a basic open-hearth slag; it is hotter and, therefore, possibly more rapid in its action, but this advantage is offset by the high electrode and power cost. Yet in the electric process for removing phosphorus and sulphur, as practiced today, it is not practical to eliminate these impurities and also deoxidize the steel with only a single slag.

This electric converter process may be compared with the Bessemer process from two standpoints: First, assuming that only low phosphorus and low sulphur pig iron is used; and second, assuming that impure iron is used. The program of the electric convertor process for treating low phosphorus and low sulphur iron would be as follows: The molten pig iron is charged into a basic-lined, electric converter. The type of converter which has most advantages for this purpose is an induction heated vessel having a main central pot into the rear of which the tuyeres enter, and having two or more channels connecting with this main pot.

The pig iron ordinarily would contain 1.5 per cent silicon and 0.75 to 0.85 per cent manganese. If low silicon iron could be readily obtained, it would be so much the better for this process. But high silicon iron, which is more common, may be worked by the process, it merely involving the additional steps of lowering the content of silicon. Lime or limestone may be used for this purpose and is charged into the molten iron at the start. The metal, heated to about 1,450 degrees Cent., is blown with a gaseous mixture which might well contain about 8 per cent carbon monoxide and 15 per cent carbon dioxide. The carbon is taken out until a fracture sample shows that the proper carbon remains. It is possible, by timing the blow, to come very close to the desired percentage of carbon. The loss of manganese will be small enough so that the final percentage should not differ more than 0.05 per cent or 0.10 per cent from the per cent at the start. The silicon may be entirely removed or only in part. Finally, any killing treatment desired may be given to the steel after the desired analysis is attained. In this process the oxidation loss of iron and manganese common in Bessemer practice can be almost entirely avoided.

The operation, when high phosphorus and sulphur iron is used, is quite similar to that just described. The raw material, of course, consists of low grade iron. It is charged molten into the electric converter and lime is added to take up and hold the phosphorus and sulphur. In one method of operation the blow of gas is continued until practically all the carbon is oxidized and eliminated, a few tenths of one per cent only remaining, and likewise until the silicon is practically all taken up by the lime, as calcium silicate. Continuation of this blow in the presence of the lime slag then takes out the phosphorus without formation of iron oxide. The interesting feature is that sulphur is also taken out and held out of the metal by that same slag. By this treatment the heavy loss of iron in the basic slag common to basic processes is avoided, and at the same time the slag is enabled to take up sulphur, which is in marked contrast with the basic process wherein the presence of iron oxide in the basic slag prevents such removal of sulphur to any appreciable extent.

Removal of Sulphur.

Instead of practicing this process as just outlined it is possible to apply it to molten pig iron at relatively low temperature and take out both phosphorus and sulphur before carbon. Contrary to some statements to the effect that a high temperature is necessary to remove sulphur, it was found in the tests we made that sulphur could be rapidly removed from molten pig iron at temperatures as low as 1,-

200 to 1,300 degrees Cent. by the action of the gas together with a lime slag to which was added a small amount of fluorspar to increase fluidity. The sulphur was usually found in the slag as calcium sulphide.

Advantages of Electric Converter Process.

As compared with the combination process using a Bessemer converter and an electric arc furnace, the electric converter process presents several important advantages: First, the complete process is carried out in a single apparatus, thereby avoiding the inconvenience and loss of time, heat, and metal contingent on transferring molten steel from one furnace to another and also avoiding the necessity of twice heating the same metal; second, the attractive feature of the basic Bessemer process, namely the rapid elimination of phosphorus, may be taken advantage of without incurring its disadvantages in the loss of metal by oxidation and danger of over-blowing the steel; third, specially skilled operators are not essential to success of the process and there is no danger of over-blowing; fourth, high sulphur iron can be used and this alone is a most important feature because of the large amounts of ore high in sulphur; fifth, the necessity of removing one slag and replacing it by another is avoided; sixth, the additions necessary in other processes are either greatly lessened or entirely avoided and also the losses attending those additions; and there are other advantages, among them being the ability to give the molten metal a killing treatment and to closely regulate its temperature all in one single furnace.

Use of Induction Furnace.

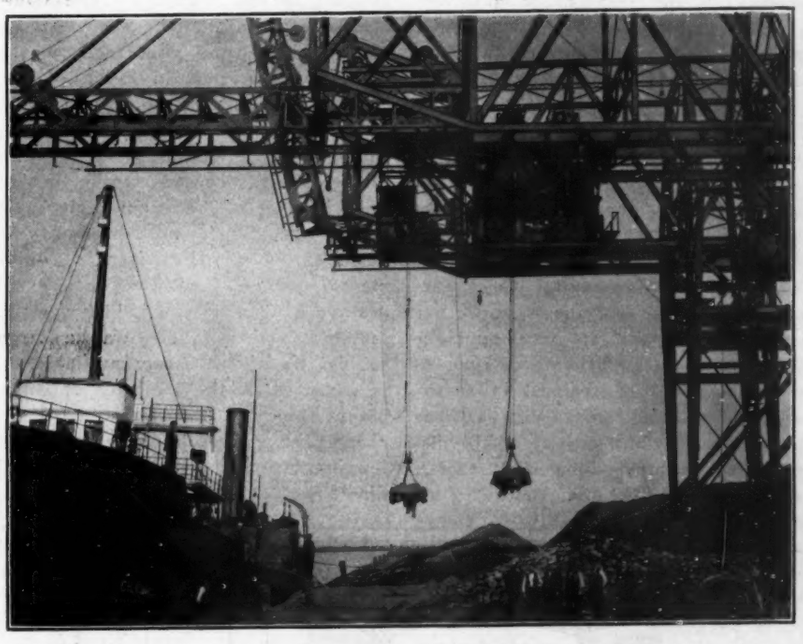
In the tests of this process various types of furnaces have been used, including the induction type, to which reference already has been made. The process is at present installed for test in a two-ton furnace. The induction furnace has shown important advantages, in that it produces the heat where most heat is needed and does so without the heavy electrode cost attendant upon arc furnace operation. We expect to consume, in the operation of this process in large induction-heated furnaces, less than 30-killowatt hours per ton of steel. This may sound very radical, yet when it is remembered that steel can be kept molten in induction furnaces with an expenditure of about 80 kilowatts of power per ton and that it has been possible to carry out this process in less than one-third of an hour, the estimate is very reasonable. Such a low power consumption as 30-killowatt hours per ton, costing, at ½ cent per hour, only 15 cents per ton, makes the use of electric heat assume an entirely different aspect in the development of a competitor of the converter or open-hearth furnace.

The substitution of a gas containing carbon monoxide and carbon dioxide for air does not involve as great a change in present methods as at first it may appear to do. Such gas as is needed to carry out this process is available from cupolas or blast furnaces or may be made in a very simple gas producer. Blast furnace gas is preferably modified by mixture with stack gas, since the percentage of carbon monoxide in blast furnace gas is usually much higher than required. The process itself, at least in so far as the elimination of carbon is concerned, is a gas producer process, the off-coming gas being richer in CO and lower in CO_2 than when blown into the metal; and this fact opens the possibility of using the gas over and over by burning a part of it to maintain the desired composition.

The Belgian consul at Yokohama reports that the Japanese government proposes to make extensive improvements to the plant of the Imperial Japanese Iron & Steel Works, at Wakamatsu, Japan. A fourth blast furnace and eight open-hearth furnaces are to be built, and the annual output of finished material will be increased to 300,000 tons.

Unloading Pig Iron From Vessel by Magnets

In the accompanying illustration are shown two lifting magnets built by the Cutler-Hammer Mfg. Co., Milwaukee, employed in unloading pig iron from the hold of a vessel tied up at the dock of the Inland Steel Co., Indiana Harbor, Ind. These two magnets, in 10½ hours actual working time, unloaded 4,000,000 pounds of pig iron from the hold of the steamer Erwin L. Fisher. This vessel docked at 7:15 a. m. and cleared at 7:20 p. m. the same day. The magnets were operated from 7:35 in the morning until 6:36 p. m., with the exception of one-half hour at noon, and maintained an average lift per magnet of 3,427 pounds. It will be noted that the pig iron was machine cast and to have unloaded this material by hand would have required a large force of men. The magnets used at the Indiana Harbor dock are of the standard, 62-inch type.



Unloading Pig Iron From the Hold of a Vessel With Lifting Magnets

---

No work on the remodeling of the blast furnace of the Bessie Ferro-Silicon Iron Co.'s plant at New Straitsville, O., has been done since construction was stopped in February, 1909, when two-thirds of the work had been completed. The contractor, H. H. Hossman, Portsmouth, O., has a first mortgage on the completed plant. The stack has not been in blast since June 1, 1908.

An Electric Furnace for Heating Steel Bars[1]

Results Obtained With an Electric Furnace for Heating Bars and Billets for Forging

By Thaddeus F. Baily

The possibility of an electric furnace for heating metal without melting it was suggested by the writer some years ago on noting the very wasteful and thermally inefficient oil-fired furnaces for heating forging stock used in a comparatively modern plant in northern Ohio.

A calculation of the thermal efficiency of the furnaces in question, which were said to be of the most modern construction, showed that less than 4 per cent of the heat value of the fuel was delivered into the steel. The technical press and various publications at the time contained a number of descriptions and tests of electrical furnaces then in use in the chemical industry, and also of furnaces for melting and refining steel. The thermal efficiency of these furnaces was given at from 40 to 80 per cent, and it was at once apparent that if a thermal efficiency of even 40 per cent could be realized in a furnace for heating stock such as was heated in oil furnaces at a thermal efficiency of only 4 per cent, that a very considerable loss could be allowed in the means for converting the heat value of any fuel into electrical energy for use in electric heating furnaces, and still effect a saving.

Taking even a case where the least efficient of the modern prime movers —the non-condensing steam engine— was used for generating power, allowing a net thermal efficiency of 5 per cent for conversion of the heat value of the local into electrical energy, and assuming an electrical furnace efficiency of 40 per cent, the net over-all efficiency for the entire heating equipment would be 2 per cent. The fuel for creating the steam, however, would cost only one-third as much per heat unit as would the fuel oil for oil furnaces. The commercial efficiency, then, as far as cost of fuel alone was concerned, would be 33 1/3 per cent in favor of the electric equipment, in spite of the low efficiency of the steam engine. Considering steam engine, low pressure turbine units, or gas engine-driven units in place of the steam engine unit above considered, the probable efficiencies of electrical furnace equipments seemed favorable enough to deserve a place in the industry, while in plants where there was a large supply of exhaust steam available, as is the case in the majority of forge plants, electric energy could be so cheaply produced by means of the low-pressure turbine that no type of direct-fired furnace could hope to compete with such equipment in cost of heating. The only question, then, seemed to be whether an electric heating furnace could be designed to successfully heat metal at thermal efficiencies above a given limit.

The greatest difficulties encountered in the operation of the first experimental furnaces were due largely to lack of sufficient electric current and control devices. Suitable equipment was, however, obtained by installing the 120 kilowatt generator and transformer equipment, mentioned later, at the plant of the Transue & Williams Co., Alliance, O., which concern very generously supplied the power for driving the generator from its gas engine for all the runs on the furnace.

The following is a description of the furnace evolved out of the experiments commenced over four years ago. Reference may be made to Fig. 1, a right-left section; to Fig. 3, a front-back middle section; and to Fig. 2, sectional plan of the furnace.

The furnace is of the resistance type, and consists essentially of two carbon electrodes, spaced from each other, and an intermediate resistance body of a carbonaceous composition in which the heat is generated. In the space directly above the resistance material and directly under the roof of the furnace is placed the metal to be heated, a ledge at the rear of the furnace and one at the opening supporting the bars or billets as the case may be. The electrodes enter the furnace through the rear wall, and are placed slightly convergent, so that the path of the electric current will be shorter from electrode to electrode at the front of the furnace than at the back. This arrangement compensates for the cooling effect, which is greater in the front of the furnace on account of the opening and the charging of the cold material. The electrodes entering the furnace from the

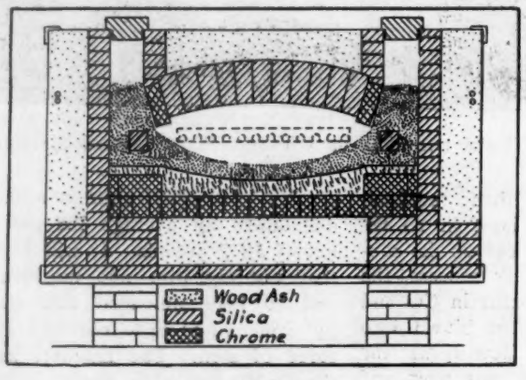


FIG. 1—VERTICAL RIGHT-LEFT SECTION OF ELECTRIC HEATING FURNACE.

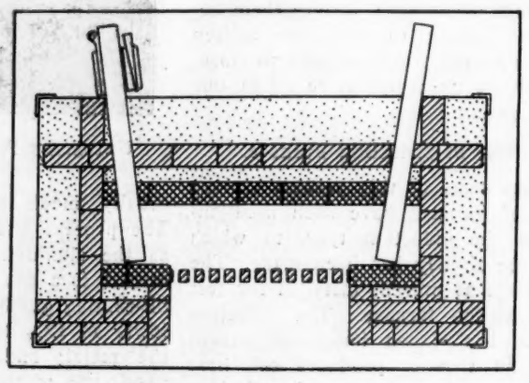


FIG. 2—HORIZONTAL SECTION OF FURNACE.

[1]Read at the New York meeting of the American Electro-Chemical Society

rear present comparatively large contact surfaces to the resistance material, without the use of special electrode sections. The electrodes are also placed in a plane above the resistance material, which throws the shortest path for the electric current in the upper part of the resistance body and nearest the metal. This is a feature that seems almost indispensable to the successful operation of a furnace of this character, since in the furnaces constructed without this feature, the cooling of the upper part of the resistance body by the cold steel caused the electric current to take a lower path, in which portion of the body the temperature became very high and melted out the bottom linings and the bottom of the furnace itself, and at the same time did not maintain the heating chamber at a temperature high enough to heat the metal.

Resistance Material.

The resistance material is composed of coke or coal. Crushed foundry coke passing over a 0.25-inch ring and through a 0.37-inch ring giving the most satisfactory and uniform results. For a 40-kilowatt furnace, heating 150 pounds of metal per hour, the distance between electrodes should be 36 inches and the cross-sectional area about 24 square inches. To maintain an electrical input of 40 kilowatts, a voltage of 200 would be required with a coke resistance body; if the body is composed of coal, the voltage should be about 150 volts. It is extremely difficult to determine the effective cross-sectional area of the material through which the electric current passes, as at working temperatures the lining materials become almost as good conductors of electricity as the resistance material itself. The resistance body as it approaches the electrodes has a very greatly increased cross-section, so as to provide a better contact with the electrodes, prevent undue heating at the point of contact, and prevent, to as great an extent as possible, the dissipation of heat through resistance to the passage of the current except at that part of the resistance body directly under the metal. Thus, in a way, these increased cross-sections perform the mission of electrodes, as they conduct the current from the electrodes proper, which are located in a protected part of the furnace, to the part where the transformation into heat is desired, and they do this without any considerable heat being generated in these portions themselves.

The most serviceable lining material so far obtained is made of chrome brick and chrome ore, and while a certain reducing action takes place between the chrome ore and brick and the carbon of the resistance material, it is not of such nature as to seriously impair its usefulness as a lining material. This chrome lining is carried up to at least one course above the resistance material. The lining is readily accessible for repairs or inspection by removing the three courses of silica brick directly under the furnace opening.

The top of the furnace is composed of silica arch brick, and is 9 inches thick, and clamped from front to back. A row of chrome arch brick is placed at each side of the

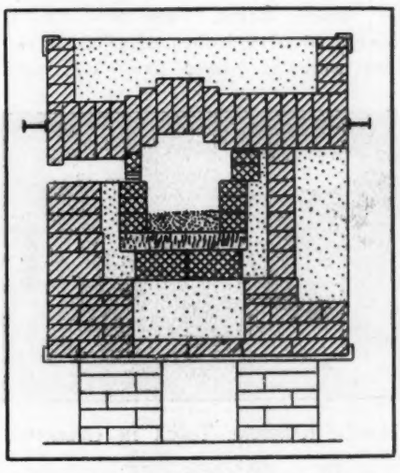


FIG. 3—VERTICAL, FRONT-BACK, MIDDLE SECTION OF FURNACE

roof to prevent contact of the silica brick with the carbon in the hoppers above the electrodes. The sides of the furnace are composed of silica brick and, in the larger furnaces, are incased in a sheet steel frame. Insulating material is placed between the silica brick and the casing. The furnace base consists of a heavy cast iron plate supported by cast iron legs or brick piers.

The cable terminals are connected with the electrodes by means of iron sleeves, copper straps and iron wedges. In making the connection, the iron sleeve is placed over the end of the electrode and copper straps placed against the four sides of the electrode. The copper cable terminal is then placed between one of the copper strips and the iron sleeve, and wedges driven in on the opposite side between the strap and sleeve, and a firm contact thus secured. Wedges are then driven in on the other two sides between the copper strips and the sleeve. In this way the current flow is equally distributed on all four sides of the electrode by means of the encircling iron sleeve.

Furnace Control.

The furnace is controlled by means of a regulating transformer and controller. The transformer gives full rated output at the lowest voltage rating. While hand regulation is usually provided, the regulation may be made automatic at a slight additional cost. A voltage range of from 33 to 50 per cent is usually provided, depending on the operating and starting requirements.

Each furnace is provided with a single panel switchboard having mounted on it a voltmeter, ammeter, watt-hour meter, circuit-breaker and oil switch. The voltmeter and ammeter indicate at all times the conditions in the interior of the furnace, as irregularities are readily noticeable on the instruments. The watt-hour meter enables accurate data to be kept on the current consumption for heating any particular class of work.

Temperatures.

The temperatures that may be obtained are limited solely by the electrical input and the temperatures allowable by the refractory linings of the furnace. The temperature usually maintained in a furnace for the rapid heating of stock for automobile forgings is such as to cause the fusion of the ends of the silica brick forming the roof, and is probably not less than 3,200 degrees Fahr. (1,765 degrees Cent.). The resistance material, of course, reaches a much higher temperature. When working at the highest temperatures usually met in forge practice, a renewal of the lining of the bottom of the furnace will be required every two to three weeks.

Reducing Atmosphere.

The metal being heated is maintained in a reducing atmosphere, the high temperature carbon resistance material giving off a gas of a reducing nature. The electric furnace is the only furnace built in small units in which both a high temperature and a reducing atmosphere may be maintained. The saving in oxidation loss is very considerable in small furnaces of this character, as the loss from oxidation in the usual combustion furnace is the cause of the loss

of a large number of forgings, due to the fact that a piece of stock, having lost a considerable amount of metal by the oxidizing flame of the combustion furnace, does not contain enough metal to fill the dies.

The thermal efficiency of the furnaces varies with the size, the percentage of operation at full capacity and the ruling temperature required. Efficiencies of from 33 to 65 per cent may be expected in furnaces with heating capacities of from 120 to 1,000 pounds per hour.

Reference was made in the first part of this paper to the experimental furnace installed at the plant of the Transue & Williams Co., and a description of the apparatus and results obtained may be of interest.

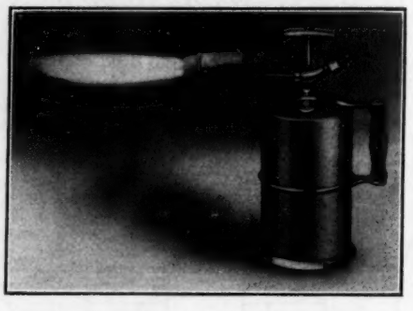
Experimental Furnace.

The power for driving the generator was supplied by a 12 x 16-inch Buckeye, four-cylinder, which not only acting gas engine, which not only drove the generator for supplying current to the furnace, but also for driving a portion of the motors in the machine shop, so that only part of the time was sufficient power available for furnace operation. Belted to the fly-wheel of the gas engine was the 120-kilowatt, 2-phase, 440-volt revolving field alternator, only one phase of which was connected up. The leads from this phase were connected with the low-tension terminals of a 37.5-kilowatt, 440 to 2,200-volt transformer. The current was then stepped down by means of a 2,200-220 or 110-volt transformer, the coils on the low-tension side being so connected through a double-throw switch for either series or parallel operation, so that a normal voltage of either 110 or 220 volts could be obtained. The variations between 110 volts and 220 volts on the lower voltage and also on the voltages above 220 were obtained by varying the field of the alternator. By this arrangement a possible voltage range could be obtained of from 90 to 300 volts, which was more than ample for conditions of operation. Inability to readily obtain a 2,200-volt generator of proper size accounted for the use of the 440-2,200 step-up transformer. From the double-throw switch the current was conducted to the furnace, located in the forge shop, some 75 feet distant.

The instruments mounted on the switchboard consisted of a 150-volt voltmeter and a 600-ampere ammeter, both made by the Westinghouse Electric & Mfg. Co. The voltmeter was so connected that when the low-tension coils of the step-down transformer were thrown in parallel, the instrument gave a direct reading, and when in series, the indicated voltage was half the actual voltage.

The furnace was constructed substantially in accordance with the description given in the first part of this paper, except that air spaces were used in place of the insulating material shown in Fig. 2, and it was rated as a 40-kilowatt unit, having a heating capacity of 120 pounds per hour, the heating capacity being rated somewhat lower than the usual practice on account of the high temperature required.

The electrodes were 4 x 4 x 48 inches long, composed of carbon, and were spaced 36 inches from each other. The cross-sectional area of the resistance material was approximately 24 square inches. The walls were composed of 9 inches of silica brick, and were of rather loose construction, owing to the numerous changes that were made and to the jar from the hammers in the plant. The runs on the furnace were made under rather unfavorable conditions, since the forgings that were made under the hammer that the furnace supplied were very difficult to make, and unless the metal was very hot, it would not fill out in the dies. Much delay was also caused by trouble with both the hammer and the dies, any such delay affecting, of course, the amount of metal heated in the furnace.



HAUCK KEROSENE TORCH IN OPERATION

Stock Heated.

The stock heated included 1¼-inch square, 1½ x ⅝-inch flat, 1½ and ⅞-inch round bars in lengths from 22½ inches to 6 feet long; 4 to 12-inch cuts were taken off at each heating and the bars replaced in the furnace. From 7 to 9 bars were heated at a time.

The current efficiency taken over periods of 9 hours when heating the heavier of the above mentioned stock was from 3 to 3 1/3 pounds of metal per kilowatt hour.

A voltage of 250 volts was usually used in starting the furnace in the morning. From one to two hours was usually required to bring the furnace up to temperature. The voltage was then reduced to about 200 volts when using a coke resistance body, or 150 volts for a coal body, which tensions enabled the required electric input to be maintained.

Some of the various linings used before the chrome lining was selected were magnesia, carborundum and silica. The chrome lining, however, gave by far the most satisfactory and uniform service, lasting three weeks without renewal or repair. As only the bottom lining is subjected to very high temperature, it is practically the only part requiring renewal, and as the usual bridge wall used in oil furnaces is not required, that saving compensates for the cost of renewals of the lining of the electric furnace.

The principal advantages of the electric furnace are its high thermal efficiency, its non-oxidizing atmosphere in the furnace chamber at all temperatures, and its freedom from soot, smoke and the hot contaminating gases of the products of combustion.

There seems little reason to doubt that the electric furnace will soon occupy an important place for heating metal such as is now heated in small direct-fired furnaces.

Kerosene Torch

In the accompanying illustration is shown a hand torch in which kerosene in place of gasoline is used for fuel. This adapts it to a wider range of usefulness than the gasoline torch as there is absolutely no danger from an explosion by its use. It is claimed that the kerosene torch produces a larger and cleaner flame than one of the gasoline type and is economical of operation, requiring only a small amount of kerosene. A small torch having capacity of ½ gallon of kerosene and an oil consumption of 2½ pints per hour produces a flame 12 inches long. It is claimed that the flame will melt a 1-inch brass rod in two minutes. The torch is made in three sizes by the Hauck Mfg. Co., Brooklyn, N. Y.

Reading railroad shops at Reading, Pa., have gone on a working basis of five days a week of nine hours each, instead of four days of eight hours each. The working force has also been increased.

IRON AND STEEL SECURITIES

The New York stock market was inactive, but with a firm undertone, the prevailing disposition apparently being to wait for the decisions of the supreme court in the pending so-called trust cases.

On Monday the market was slow, many of the brokers' offices being crowded with anxious customers watching for the supreme court decision announcements; dealings were light, and all active issues were unchanged for the day. Although the market was firm in tone Tuesday, extreme dullness prevailed. The market Wednesday was more active but irregular, and although a few specials advanced, the regular list was lower at the close; President Taft in a short message urged the passage of the Canadian reciprocity bill. Sales on Thursday aggregated 133,000 shares; excepting a few specials on Thursday, the price movement was insignificant; the grain markets declined on improved prospects for winter wheat. Shares to the number of only 129,500 changed hands on Friday, a new low record for several years, and the market closed heavy; foreign share markets were firmer; grain markets rallied. The market on Saturday was dull but closed with a steady undertone; the Minnesota rate cases were decided by the federal circuit court at St. Paul in favor of the railroads.

Call money ranged from 2½ to 2 per cent; the market being extremely easy. Time money was unchanged throughout the week. The actual condition of clearing house banks showed loans decreased $2,594,500; deposits decreased $3,584,300; reserve increased $481,900; surplus increased $1,413,600, the total surplus standing at $28,166,775 and the percentage of actual reserve being 27.02, an increase of 0.1 per cent. Non-member banks and trust companies showed loans increased $13,542,300; net deposits increased $18,281,100; reserve increased $4,521,000; and the percentage of reserve, 17.7, an increase of 0.3. The fortnightly railroad statistics showed that the number of idle cars were 194,887, compared with 207,261 the two weeks previous, a decrease of 12,374, or 5.9 per cent in idle cars. A considerable part of this decrease was due to a heavier demand for coke and stock cars. Bank clearings for the week showed an increase of 10.5 per cent above last week, and 1.9 per cent above last year. Commercial failures for the week were 235, compared with 244 the preceding week, and 274 the corresponding week last year. Shares were sold to the number of 966,100, compared with 1,340,161 the preceding week, and 2,398,400 the corresponding week last year. Bonds, exclusive of government bonds, were sold to the amount of $12,501,000, compared with $13,359,000 the preceding week, and $10,631,000 the corresponding week last year.

	Closing Quo. Apr. 8	Changes in week	Annual Meeting date 1911.	Stock Outstanding	Basis	Dividend: Last Dividend	Dividend: Date Last Div. Pay.
Allis-Chalmers	8	.....		$19,820,000		.....	.....
Allis-Chalmers, pr	30¼	— ¾	Nov. 2	16,150,000	7 cum.	1¾ Q.	Feb., 1904
American Can	9⅞	+ ⅛	Feb. 1	41,233,300		1¾ Q.	.....
American Can, pr	83⅞	+3¾		41,233,300	7 cum.	1¾ Q.	Apr., 1911
Am. Car & Fdy	52⅞	— ⅜	June 29	30,000,000		½ Q.	Apr., 1911
Am. Car & Fdy., pr	115½	—1		30,000,000	n. c.	1¾ Q.	Apr., 1911
American Loc	37½	— ½	Oct. 17	25,000,000	5	1¼ Q.	Aug., 1908
American Loc., pr	107	— ½		25,000,000	7 cum.	1¾ Q.	Apr., 1911
American Ship	73¼	+1⅜	Oct. 11	7,600,000	4	1 Q.	Sept., 1910
American Ship, pr	111	— ⅜		7,900,000	7 cum.	1¾ Q.	Apr., 1911
Am. Steel Foundries	40¾	—6¼	Dec. 7	17,184,000		1¼ Q.	Feb., 1911
Barney & Smith	20	.....	June 6	2,000,000	4	1 Q.	Dec., 1907
Barney & Smith, pr	90	.....		2,500,000	8 cum.	2 Q.	Mar., 1911
Bethlehem Steel	34⅛	+2⅛	April 4	14,862,000		.....	.....
Bethlehem Steel, pr	63¾	+1¼		14,908,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	47	— ⅜	Mar. 21	45,000,000	5	1¼ Q.	Feb., 1911
Cambria Iron	45	—1		8,468,000*	4	2 S. A.	Apr., 1911
Chicago Pneumatic Tool	53⅛	+ ⅞	Feb. 20	6,485,800	4	1 Q.	Apr., 1911
Colorado Fuel	31½	.....	Oct. 16	34,235,500		1¾ Q.	Apr., 1902
Crucible Steel	127⅞	— ⅛	Oct. 18	24,578,400		3½.	.....
Crucible Steel, pr	79	— ¾		24,463,500	7 cum.	1¾ Q.	Mar., 1911
Empire Steel	5	.....	Feb. 22	1,254,770		.....	.....
Empire Steel, pr	50	.....		2,500,000	6 cum.	2 S. A.	Jan., 1911
Fay & Egan	70	.....	Feb. 21	1,000,000	6 cum.	3 S. A.	Feb., 1909
Fay & Egan, pr	110	.....		1,000,000	7 cum.	1¾ Q.	Feb., 1911
General Electric	150⅜	+1⅝	May 9	65,179,600	8	2 Q.	Apr., 1911
Harbison-Walker	41	.....	Jan. 16	18,000,000		½ Q.	Mar., 1911
Harbison-Walker, pr	96	.....		9,600,000	6 cum.	1½ Q.	Apr., 1911
International Pump	40¾	+ ⅛	Dec. 12	17,762,500		1 Q.	Nov., 1910
International Pump, pr	89	+ ½		11,350,000	6 cum.	1½ Q.	May, 1911
Lackawanna Steel	44	.....	Mar. 8	34,978,000		.....	.....
Lake Sup. Corp	28⅞	+ ⅛	Oct. 4	40,000,000		.....	.....
New York Air Brake	72	.....	Mar. 8	10,000,000	5	1½ Q.	Apr., 1911
Niles-Bement-Pond	94	.....	Feb. 8	8,500,000	6	1½ Q.	Mar., 1911
Niles-Bement-Pond, pr	104	.....		2,000,000	6 cum.	1½ Q.	Mar., 1911
Otis Elevator Co	64	+2	Mar. 20	6,375,000	3	2 S. A.	Apr., 1911
Otis Elevator Co., pr	98½	+1½		6,310,000	6 n. c.	1½ Q.	Apr., 1911
Pa. Steel	60	.....	May 8	10,750,000		.....	.....
Pa. Steel, pr	108½	+1		16,500,000	7 n. c.	3½ S. A.	Nov., 1910
Pittsburg Coal Co	21½	+ ¼	Feb. 10	28,104,600		.....	.....
Pittsburg Coal Co., pr	81½	+2⅜		27,071,800	7 cum.	1¾ Q.	Apr., 1911
Pressed Steel Car	32⅞	— ⅜	Feb. 15	12,500,000		1 Q.	Aug., 1904
Pressed Steel Car, pr	98¼	+ ¼		12,500,000	7 n. c.	1¾ Q.	Feb., 1911
Pullman	160	.....	Nov. 8	120,000,000	8	2 Q.	Feb., 1911
Railway Stl. Spring	33	—1	Mar. 2	13,500,000	2	1 S. A.	Oct., 1908
Railway Stl. Spring, pr	100	+1		13,500,000	7 cum.	1¾ Q.	Mar., 1911
Rep. Iron & Steel	33	— ½	Oct. 18	27,191,000		.....	.....
Rep. Iron & Steel, pr	97⅝	— ⅛		25,000,000	7 cum.	1¾ Q.	Apr., 1911
Sloss-Sheffield	52½	— ½	Mar. 15	10,000,000	5	1¼ Q.	Sept., 1910
Sloss-Sheffield, pr	112	.....		6,700,000	7 n. c.	1¾ Q.	Apr., 1911
U. S. Pipe & Fdy. Co	16½	— ⅛	June 28	12,106,300	2	1 Q.	Dec., 1910
U. S. Pipe & Fdy. Co., pr	58¾	+ ½		12,106,300	7 n. c.	1¾ Q.	Mar., 1911
U. S. Steel	77⅜	— ¼	April 17	508,302,500	5	1¼ Q.	Mar., 1911
U. S. Steel, pr	119	.....		360,281,100	7 cum.	1¾ Q.	Feb., 1911
U. S. Steel, 5s	105⅝	+ ⅛		463,798,000	5	.....	.....
Va. Iron, Coal & Coke	60	.....	Sept. 19	9,073,680		5. †	Oct., 1907
Westinghouse Electric	66	— ½	July 26	3,998,700*		3½ Q. **	Apr., 1911
Westinghouse Air Brake	142	+ ¾	Oct. 3	13,750,000*		5 Q. ‡	Apr., 1911

Par value of shares, $100, except those starred (*), $50.
**Includes 1¾ per cent on back dividends.
†Stock.
‡Includes 2½ regular, 1½ extra and 1 special.

Copper Stocks.

New York.—Amalgamated Copper closed 62¼, a net loss of ½.

Boston.—Butte Coalition closed 17, a net loss of 1¼; Calumet & Arizona closed 49½, a net loss of 1½; Calumet & Hecla closed 490, a net gain of 5; North Butte Mining closed 27¼, a net loss of 1½; Quincy Mining closed 67¾, a net loss of ¼.

THE IRON TRADE REVIEW

Devoted to Iron and Steel Manufacture and to the Machinery, Metal-Working and Foundry Trades.

Published Every Thursday by
THE PENTON PUBLISHING CO.,
CLEVELAND.

CHICAGO .....1328 Monadnock Blk.
CINCINNATI.....808 Provident Bank Bldg.
NEW YORK.....1115 West St. Bldg.
PITTSBURG.....2148-49 Oliver Bldg.
WASHINGTON, D. C.....Post Bldg.

Subscription, United States and Mexico, $3.00 per annum. To Canada and Foreign Countries, $4.50. The price of copies issued three months or more previous to date of current issue will be 25 cents each. Advertising rates furnished on application.

Change of advertising copy must reach this office ten days preceding date of publication.

The Cleveland News Co. will supply THE IRON TRADE REVIEW through the regular channels of the American News Co.

European Agents: The International News Company, Breams Building, Chancery Lane, London. E. C., England.

ENTERED AT THE POSTOFFICE AT CLEVELAND AS SECOND CLASS MATTER.

PRINTED IN AN OPEN SHOP.

Copyright 1911 by Penton Publishing Co.

THE AVERAGE PAID CIRCULATION OF THE IRON TRADE REVIEW FOR THE ISSUES OF THE FOLLOWING MONTHS WAS:

January, 1910	5,861
February	5,703
March	5,754
April	5,793
May	5,827
June	5,842
July	5,864
August	5,875
September	5,895
October	5,955
November	5,993
December	6,026
January, 1911	6,058
February	6,072
March	6,091

April 13, 1911

Specifications for Railroad Spikes

A railroad spike is a very simple article, almost elementary in its general configuration, and those not familiar with the spike trade will probably be surprised to learn that nearly every railroad with any pretentions has its own specification. The shape and slope of the head, the position of the "bulge" and other small details are specified, while chemical composition and physical tests are also prescribed with a nicety of detail which would give the observer the impression that the engineer was a thorough-going expert as to what will make the best spike, provided the observer did not also observe that all spikes are expected to hold the same kind of rail onto practically the same kind of tie, and that there are almost as many spike specifications as there are engineers.

There is the American Railway Engineering and Maintenance of Way Association, which held a lengthy annual convention in Chicago, last month, but its time seemed to be taken up chiefly with a perennial job known as "revising the manual," which manual after all is merely suggestive and not mandatory. For it to adopt a standard for spikes which would be observed by the railroad engineers would save a great deal of trouble to the engineers and to the spike manufacturers. The latter would like to be saved the trouble; the former, there is reason to suspect, are not anxious to be saved the trouble.

It can not be considered unreasonable to hold that after so many years of experience it ought to be possible to determine what is the best shape for a railroad spike, or at least to narrow the choice down to a few shapes, while as to chemical composition there should not be much room for question. The diversification of spike specifications is comparatively recent, and as a consequence the specification that the steel shall be open-hearth is much in evidence, while in many cases open-hearth steel is not specifically mentioned, but a phosphorus limit is inserted, which performs the same function. Then, again, tensile strengths are specified which may be called high for soft steel. One prominent system calls for tensile strength between 60,000 and 65,000 pounds. As the spike must be driven into wood, it would seem that so high a tensile strength is quite unnecessary, for the spike must be large in section in order to give it holding power, and that large section surely provides ample strength even with steel of relatively low tensile strength.

The price at which spikes are sold makes it burdensome for the manufacturer to be restricted by a great diversity of specifications. It is impossible to make up stocks with any degree of confidence, and when spikes are sold on contract, subject to directions later as to when and in what quantities they are to be shipped the burden is frequently onerous. Spikes have been selling at $1.55 per 100 pounds, the price for delivery after April 1 having been advanced to $1.60. At this latter figure, spikes are only $4 per ton higher than the base price on steel bars, and while spike rods are by custom considered a base price proposition, the fact is that a 9/16-inch square bar, if ordered as a bar, takes an extra of $2 a ton. The actual cost of manufacture is greatly in excess of the spread, and yet as a rule spikes are subject to much more rigid requirements than are steel bars.

Price competition is at this time practically absent from the spike trade, but an insidious form of competition has been forced into the trade, for no manufacturer knows where to draw the line in the matter of specifications. If this kind of competition tended to produce better quality and crystallize the specifications into one generally accepted, progress would be made, but the tendency does not appear to be in that direction.

When the Canal is Finished

With the completion of the Panama canal in sight, the effect of the opening of the canal on various parts of the country, and particularly the south and the Pacific coast, is being widely discussed. The iron and steel industries of the Pacific coast and particularly of California, are much depressed at this time on account of the long continued labor troubles and the high price of raw materials. With English, Continental and Chinese foundry iron selling at San Francisco for $23 a ton and southern No. 2 foundry at $21 to $22, together with the high cost of labor he must pay, the manufacturer in California has little chance of competing successfully with the eastern manufacturer.

The old manufacturing interests of

San Francisco are now merely eking out an existence by doing what repair work offers, and such structural work and extremely heavy mining machinery as cannot be readily shipped from the east. Under the present conditions of freight transportation from the east to the coast, the freight rate on southern No. 2 domestic foundry iron is between $10 and $11 a ton. With the completion of the Panama canal, this rate can be reduced to $4 or $5 on pig iron and on other raw materials in proportion. Southern No. 2 foundry iron can then be sold on the Pacific coast at $15 to $16 a ton with the same percentage of profit as at present. Consequently the cost of manufacturing iron and steel products will be reduced approximately 15 per cent, which will to some extent equalize the wage differential which the coast manufacturer now pays over his eastern competitor.

Just what effect this will have as to stimulating activity on the Pacific coast, is hard to predict. Beyond a doubt the price of foreign pig iron will be reduced to meet the price of domestic iron. Though there is no adequate supply of coal or coking coal on the Pacific coast, there is in abundance a good fuel oil, which can be used very satisfactorily in the manufacture of steel. Electric smelting of pig iron is being actively taken up on the coast, where unlimited water power is now going to waste. One significant fact is that the production as well as the consumption of iron and steel products will be greatly increased by the decrease in the cost of foundry iron as a result of a lower freight rate to the coast.

Report Worthy of Careful Study

An exposition, comparatively slight merely because of lack of space and because copies of the report itself are available generally, is given on pages 735 to 739 of today's issue of THE IRON TRADE REVIEW of the report on employers' liability insurance presented by a competent committee before the annual convention of the National Metal Trades Association now in session at New York City. The report shows careful preparation after long study not only of the legal phases involved in employers' liability insurance schemes but also in the industrial side of the problem. Embodied in it also are the practical views of successful manufacturers, the members of the committee itself. It is a popular presentation, albeit complete and exhaustive, considering the main objective to be the education of industrial employers in every state of the Union, of a vital and very live question of the day. So complete is it, although compressed into 94 well printed pages, that it may well be considered a handbook on the subject for the busy but deeply interested man of affairs.

The men composing the committee which prepared this report are held in the highest esteem by their fellow manufacturers of the country, so that merely appending their names to the document is enough to attract attention to it. Even the most cursory reading cannot fail to awaken, or renew, additional interest in this present-day legislative and industrial topic. The committee has gone one step farther and has prepared a suggestion for a state law carefully drawn and embodying the best, because most practical, time-tried features that the members had been able to select from the laws on the subject in Europe and America. This proposed measure should receive as careful study by legislators and employers as the committee's report.

Altogether, this feature of one entire morning's session of the National Metal Trades Association's convention, combined with a very helpful general discussion of the problem by speakers selected especially for their competency and practicality, is one of the most unique in the history of American employers' organizations. It is a pregnant and hopeful sign of the times. The Old World has blazed the way in attempting solutions of this problem; we have just awakened in this country to the importance of the matter.

PLANT EXTENSIONS

Of Dominion Steel Corporation—No Bounty Extension.

Toronto, Can., April 11.

M. J. Butler, general manager of the Dominion Steel Corporation, gives the following details of the extensions and improvements of the Sydney plant: During the past year 120 by-product coke ovens of the most improved type, with a capacity of 720 tons per day, have been completed, costing $1,300,000. Two 500-ton open-hearth furnaces, one Bessemer converter and No. 8 blast furnace are under construction and nearing completion. A contract has been let for the superstructure of No. 7 blast furnace. A new power house is completed and the machinery is being installed. New pumps are being installed at Sydney river and a power line built from the power house to the pumping station. A merchant mill for the manufacture of bars, rods, etc., is in course of erection. There is on hand ready to erect a 22-mill for the manufacture of shapes, rolling angle bars, etc., also a plate mill. The total expenditure will amount to about $4,000,000.

The Nova Scotia Steel & Coal Co. has made new records for output in nearly all departments for the first quarter of 1911. The cogging mill at New Glasgow rolled 19,340 tons of billets, an increase of 25 per cent. The finishing mills produced 15,232 tons of bars and plates, or nearly 4,000 tons more than in the corresponding quarter of 1910. The production of pig iron was 20,546 tons, an increase of about 6,000 tons.

The impression has latterly been general that the Dominion government would renew the bounties on steel rods. This expectation, however, has proved unfounded. Finance Minister Fielding, in his annual budget speech on April 4, stated definitely that there was no intention on the part of the government of renewing them.

The contract for the Quebec bridge was finally awarded April 5, as foreshadowed some time since, to the St. Lawrence Bridge Co., an amalgamation of the Dominion Bridge Co., of Montreal, and the Canadian Bridge Co., of Walkerville. The total cost, according to the estimate of the engineers on the company's figures for the various parts of the work, will be $8,650,000. The company has deposited with the government as security for carrying out the project $1,097,500, or 15 per cent of the contract price.

CONCENTRATING MILL

For Barton Hill Ores is Planned for Port Henry.

Plans have been prepared by Witherbee, Sherman & Co., Inc., for the erection of a new modern concentrating mill of large capacity for the treatment of iron ore at Mineville, N. Y., in the Port Henry district. The mill, which will be known as No. 4, is being especially designed for the treatment of the Bessemer ores obtained from the Barton Hill property of the company. These ores are of a high grade Bessemer quality, being rich in iron content and low in phosphorus. The Barton Hill property, which has had a notable career as a producer of high grade ore and concentrates in past times, was inoperative for a number of years and has only recently resumed its position in the shipping class. Witherbee, Sherman & Co. have recently been doing considerable exploration and testing work in this deposit and have proved up a large ore body. The new concentrating mill will be equipped with magnetic separators of both the belt and drum type. Its estimated capacity will be about 1,000 tons daily, which will make it in output second only to No. 2 mill of the company now treating the richer Old Bed ores.

New York Metal Exchange Election

At the annual election of officers and members of the board of managers of the New York Metal Exchange, held April 3, the following officers were elected to serve one year: President, James E. Pope; vice president, A. B. Hall; treasurer, R. L. Crooke. B. Hochschild, of the American Metal Co., Ltd.; H. W. Hendricks, of Hendricks Bros.; G. E. Behr, of Behr & Steiner; E. Baerwald; Edwin Groves, of James M. Phyfe & Co.; Charles J. Marsh, of the Standard Underground Cable Co.; M. Parsons Todd, of the Quincy Mining Co., and A. Gardener Cooper, of Bruce & Cook, were elected to serve as a board of managers. E. A. Caswell; E. J. Keane, of Hendricks Bros.; J. Langelath; P. R. Jennings, and C. L. Trench, were elected to serve on the arbitration committee.

Orders Foundry Sale

An order has been issued by Judge Hough of the United States Circuit Court of New York, authorizing Waddill Catchings, the receiver of the Central Foundry Co., to accept the offer of Frederick H. Buss and Daniel H. Homan to purchase the property of the company in its entirety. The purchase price agreed upon is $1,659,500. The offer of purchase was made for the purpose of consummating the plan of reorganization and to bring about the transfer of the property to a new company. According to the offer, the transfer of the foundry property and the accounts receivable is to be made before April 30.

COPPER FIGURES

For March Showed Increases in Production and Stocks.

The March statement of the Copper Producers' Association shows an increase in stocks of 5,370,164 pounds. Production was 130,532,080 pounds; domestic consumption, 66,080,789 pounds; exports, 59,081,127 pounds; the total deliveries being 125,161,916 pounds.

Copper exports for the week ending April 6, were 5,534 tons, an increase of 2,051 tons; from Jan. 1 to date, 77,658 tons, an increase of 2,275 tons.

Enact Liability Law

The Edge liability bill providing compensation for injured employes was passed by the New Jersey state house of representatives, by a unanimous vote, April 3. The bill had previously passed the senate and has had the indorsement of Governor Wilson. It has also been approved by the various state labor organizations. The new law goes into effect July 4.

Maxim Retires.—An interesting personal event this week is the retirement from Vickers Son & Maxim, Ltd., of Sir Hiram Maxim. The inventor had served as a director continuously for 27 years in various kindred companies and is retiring to devote his time solely to flying machines. With Grahame White and M. Bleriot, he is developing a new aeroplane for warfare. His intention is to make a machine capable of carrying a 500-pound bomb over a distance of 40 miles and then return to the point of departure.

The steamer Henry A. Laughlin, of the Jones & Laughlin Steel Co.'s coal fleet, with a fleet of empty barges was caught in a storm near Allenport, Pa., on the Monongahela river about midnight, April 6, and a fireman and two women employes were drowned.

MODERN HOUSES

To Be Erected For Corporation Employes in the South.

The announcement that the United States Steel Corporation has appropriated the sum of $400,000 for the erection of homes for its employes of its southern plants represents an undertaking which is in line with the policy of the leading steel producer to improve the working and living conditions of the men upon its payrolls. These houses will be built for the use of the employes of the Tennessee Coal, Iron & Railroad Co. and the American Steel & Wire Co. at Ensley, Ala. The type of dwelling will be strictly modern and very complete in its arrangements, being constructed of wood, cement and brick. It will comprise ten rooms, including bath. The estimated cost of each house will be about $3,000. Work upon the construction of the new plant of the American Steel & Wire Co. is proceeding steadily and the completion of the works is expected about Oct. 1.

Courses of Study.—The Massachusetts Institute of Technology, Boston, has issued a bulletin describing the courses of study which will be offered during the months of June, July and August, as constituting the summer term. The entrance requirements to these courses are similar to those required for the same courses at other times of the year. They include the following branches: Mathematics, applied mechanics, forging, machine tool work, physics, etc. Supplementary courses in mechanical and civil engineering are also offered.

American Sheet Bars.—In the steel trade, the large influx of foreign bars continues, although apparently it does not greatly affect British business, says our Birmingham, Eng., staff correspondent. This week, the steamship Katalia has arrived at Swansea with 3,000 tons of steel bars from New York, for use in the Welsh tin plate industry. This is the largest cargo of such bars ever received at Swansea. British prices are well maintained, and all steel makers are quite satisfactorily situated for work.

George D. Selby, trustee for bondholders of the Clare Iron Co., Ironton, O., has filed suit to foreclose the mortgage on the property including 7,500 acres in Scioto and Lawrence counties, on which was located old Bloom charcoal furnace.

Report on Employers' Liability Insurance Laws

Committee of National Metal Trades Association Presented it Before National Convention Now in Session—Also Offered Suggested Bill

Intensely interesting because thoroughly digested, is the able and exhaustive report of the committee of the National Metal Trades Association on employers' liability insurance just published. The report was formally presented this morning before the thirteenth annual convention of the association now assembled in the Hotel Astor, New York City. The committee which prepared the report was composed of William Butterworth, of Deere & Co., Moline, Ill., chairman; George F. Steedman, of Curtis & Co. Mfg. Co., St. Louis; and Henry D. Sharpe, of Brown & Sharpe Mfg. Co., Providence, R. I.

A valuable contribution to the growing literature on the absorbing industrial problem of liability insurance is this report because, while dipping deeply into the statutory and judicial lore on the subject, it also contains the matured views and opinions of a committee of eminently successful manufacturers who have given months of patient study and thought to this question. It may well serve as the business man's handbook on employers' liability insurance, so complete and yet so compact is it.

Introducing the general subject, the report says:

While the question of systematic compensation for industrial accidents has been the subject of consideration and legislative action by most civilized states since 1884 when the matter was first treated by Germany, the subject but recently has been under consideration in the United States. At the present time systematic compensation is widely discussed, and has been or is being investigated by commissions in Wisconsin, New York, Minnesota, Ohio, Massachusetts, New Jersey and Illinois, and by labor bureaus, trade unions, and other organizations.

Although the subject of systematic compensation has attracted little attention in this country until quite recently, the subject of the legal relation of employer and employe, or master and servant, has not escaped attention in this country. All legislation, however, either federal or state, excepting as hereinafter noted, has been directed along two lines, viz:

(a) Legislation requiring safety appliances for the protection of the employe, or requiring regulations, sanitary or otherwise, to improve the working conditions of the servant and to safeguard his health.

(b) Legislation modifying the existing rules of law with reference to the liability of the master for injuries to his servant.

In addition to the consideration of the subject which has been given by legislative bodies, in more recent years, many employers of labor have given the question careful study and deep thought with the result that in numerous instances, either through voluntary arrangement on the part of the employer or by co-operation between the employer and employe, benefit systems have been established by means of which some compensation is made, out of a special fund, in case of the injury or death of an employe, without regard to negligence on the part of the employer as the basis of the right to compensation.

The present system of compensation for industrial accidents is now conceded to be unjust, inadequate, unsatisfactory and wasteful. It is proper, therefore, to consider what the present system is and then to consider and suggest a remedy which will be equitable and just both to the employer of labor and his employe.

The Legal Status.

Here follows an inquiry into the legal status of the relation between master and servant with more especial reference to the part played by the English common law in establishing that status. Then in order appear reviews of the "fellow servant rule" from its establishment by the Priestly case decision in 1837 by the English court of exchequer to the present time; "the assumption of risk rule," that of "contributory negligence" and finally a lucid exposition of the doctrine of "comparative negligence," and practical applications of all these rules. The statutory law as laid down by the state of Illinois, the federal laws and United States Supreme Court interpretations of the efforts of congress to enact legislation on the subject with especial application to interstate carriers was referred to, and the report takes up these phases of the general question:

The Theory of Systematic Compensation.

It has come to be considered by those who have given careful consideration to the question, that it is not enough to give to the servant employed by the master compensation only for those injuries resulting from the master's negligence. Under the rules of law just outlined, a very large proportion of the accidents which occur in the industries of the country go uncompensated. In some cases on the other hand the employer is held for substantial amounts and occasional verdicts are recovered out of all proportion to the extent of the damage really sustained; and in other instances compensation awarded for the injury is not adequate or just. In this relation we note a statement of the causes of industrial accident in 1897 in Germany: Fault of employer, 17.30 per cent; of workmen, 29.74 per cent; of both, 4.83 per cent; of fellow servant, 5.31 per cent; unavoidable danger, 41.55 per cent; act of God, 1.27 per cent. Applying these figures to the rules of law above set forth, one is impressed with the small proportion of industrial accidents in which a right to recover can be sustained by the servant. The principle which has been adopted in most civilized countries of the world within the last 25 years is a radical departure from the theory of compensation which theretofore had been in force and briefly it is as follows:

In carrying on any given industry for the benefit of those who will enjoy the products of the services supplied thereby, there will be on the whole, taking into account all the various establishments engaged in those industries, a more or less stable aggregate amount of loss and damage occasioned by industrial accidents. While each particular accident considered by itself might appear to have been preventable, if an extraordinary degree of caution had been exercised, it will also appear when the losses are spread over the entire industry, and especially when the experience of many years is combined, that there is a more or less steady ratio between the financial loss and the financial value of the entire product, indicating that accidents are governed by laws of probability and are to a certain degree inevitable.

In other words, this loss or damage as much as loss and damage by destruction of material or wear and tear of the machinery, is a part of the cost of the commodity in the production of which the workman was employed at the time the accident took place.

It follows that the working man, or his family in event of his death, should be compensated in a reasonable amount for the consequences of an industrial accident, not in order that some one shall be mulcted on the ground that he was at fault, but in order that this portion of the cost of the product or services shall not be transferred from the employer and the ultimate consumer to the workingman and his family, crushing them in many cases, and eventually shifting the burden to the community in the most undesirable form of charity.

Under this theory if justly regulated, there would be and there should be no extraordinary and certainly no ex-

cessive verdicts. Compensation should be governed by business principles.

Incorporated in the report is a lengthy quotation from the brief on "Legal Aspects of Compensation for Industrial Accidents," prepared by Carmen F. Randolph, of the New York bar, dated November, 1910. In this brief are presented the results of careful inquiry and comparison of the laws bearing upon workmen's compensation throughout Europe and Australia and even the international questions beginning to grow out of the enactment and enforcement of such laws. A review of the recently enacted compulsory compensation legislation in effect in the states of New York, Montana and Virginia is followed by sketches of the compensation schemes for accident relief worked out and put in operation by the United States Steel Corporation, the International Harvester Co., and Deere & Co. together with the plans advocated by the National Metal Trades Association, the National Cotton Manufacturers' Association, the American Federation of Labor and the National Manufacturers' Association. The report of a committee to the annual convention of the last named body held last May shows that 67 per cent of the membership favors the establishment of a voluntary mutual insurance system among employes, while 90 per cent of the membership expressed dissatisfaction with the present employers' liability laws and liability insurance system.

Turning again to the legal side of the question, the committee thus calls attention to authorities consulted and embodies the views expressed by Lindley D. Clark in the labor bureau bulletin cited:

The Legal Principles Involved.

Not only have the numerous commissions and other bodies which have investigated the question of workingmen's compensation given thought and study to the question along economic lines and for the purpose of determining what has already been done or what measures would be suitable, but the legal phases of the situation have been carefully analyzed and studied. We have before us the exhaustive brief of the constitutionality of workingmen's compensation laws compiled by Mr. H. V. Mercer, who was the attorney of the Minnesota commission; also a report of Mr. Samuel A. Harper, who was the attorney for the Illinois commission; the brief of Mr. Carmen F. Randolph of New York, which is elsewhere herein referred to; the opinion of Samuel Williston, LL.D., which is appended as "Appendix B" of the Report of the Conference of Commissions held in Chicago, November, 1910, and the article written by Mr. Lindley D. Clark, found in Bulletin No. 90 of the bureau of labor. It is not the purpose of your committee to present an exhaustive brief on the principles involved, but rather in a general way to point out the conclusions which have been reached by those who have made a minute study of the legal phases of the situation, leaving it to those who may be interested in a study of the principles involved to resort to the briefs which we have mentioned or to original research on their part. It seems to be conceded that whatever authority the legislature may have to adopt the legislation which seems to be needed, it must find its justification in what is known as "the police power."

It seems from the brief of Mr. Harper, who has given this matter particular attention with reference to the constitutional provisions in Illinois, that the greatest question for consideration is whether or not the proposed legislation creating liability without fault and arranging for automatic compensation, could be sustained against the objection that it would deprive either the employer or the employe of the right to trial by jury.

Taking up that vexatious phase of the problem pertaining to the rate of compensation, the report quotes Mr. Randolph and then the members add their own views as follows:

The Compensation Rate.

The matter of adjustment of the scale of compensation is an extremely difficult one, and in the opinion of your committee is such that no one man will be able to propose a plan which will be entirely equitable and just when considered from the standpoints of the various interests involved. All that is possible to do in that connection is to present the matter along general lines and then to suggest the scale of compensation which adheres as nearly to general principles as may be.

Each commission which has made a study of this question has made an effort to solve the question of rate. What seems to be the general conclusion along this line may be gathered from the following: November, 1910, a conference of commissioners on compensation for industrial accidents was held at Chicago. This conference met in response to a call of the Massachusetts commissioners, who desired the opinion of the commissions of the various states as to certain specific questions under consideration by the Massachusetts commission in preparing a bill for the January, 1911, meeting of the state legislature. Commissions of eight states, Illinois, Massachusetts, Minnesota, Montana, New Jersey, New York, Ohio and Wisconsin were represented and Connecticut was represented by a special delegate. The United States employers' liability commission and the United States bureau of labor were represented, and there was present a special committee of commissioners on uniform state laws charged with the preparation of uniform workmen's compensation law. The conference comprised large employers, small employers, representatives of labor, legislators and special students on workmen's compensation legislation. Certain questions relative to the features of the compensation law proposed by the Massachusetts commission were proposed to the conference on the question of rate and duration of compensation. The questions and answers were as follows:

4. Shall compensation be paid in a lump sum or in installments:

(a) Temporary disability? Installments.

(b) Permanent disability or death? Installments with right to commute after given time with approval of some public official.

5 Amount and duration of compensation?

(a) Temporary disability? Fifty per cent of the impairment of wages; maximum of $10 per week, minimum of $5 per week; or if wages less than $5, then full wages (or 66 2/3 per cent of wages up to $7.50 of wages per week, then 50 per cent of balance until compensation amounts to the maximum of $10 per week, maximum). Payments not to extend beyond period of 300 weeks.

(b) Permanent disability? Same as temporary disability.

(c) Partial permanent disability? Fifty per cent of impairment of wages; maximum of $10 per week; payments not to extend beyond period of 300 weeks.

(d) Death?

(1) Total dependents?

If orphans, 50 per cent of wages of deceased.

If widow alone, 25 per cent of wages.

ONLY SINCERE EFFORT GETS RESULTS.

It is obvious that nothing in the way of reform can be accomplished without an honest effort both on the part of employers and employes to that end, and in view of the fast forming public sentiment in favor of more uniform and equitable laws governing the relation of master and servant, and the liability for, and the right to compensation for personal injuries growing out of that relation, we believe that such reasonable legislation as may be the result of such effort will be given that construction by the courts that is in furtherance of the plan, and in the interest of the common good, without too great an adherence to the technical construction of the present law relating to the subject.

If widow and one child, 40 per cent of wages.

If widow and two children, 45 per cent of wages.

If widow and three children, 50 per cent of wages.

If widow and four children, 55 per cent of wages.

If widow and five children or more, 60 per cent of wages.

If widow, father or mother, 50 per cent of wages.

Children under 16 years of age only to be included and only during period they are under 16 years of age.

Maximum of $10 per week, minimum of $5 per week, or if full wages less than $5 their full wages (or 66 2/3 per cent of wages up to $7.50 of wages per week, then 50 per cent of balance until compensation amounts to $10 per week, maximum). Payments not to extend beyond period of 300 weeks.

2. Partial dependents? Fifty per cent of the portion of the wages contributed by the deceased to the partial dependents.

(2) No dependents? Expenses of last sickness and burial, not exceeding $200.

6. Length of waiting period? Two weeks, during which period employer shall furnish medical treatment or hospital care to an amount not exceeding $100 in value.

Exhaustive Study Needed.

Whether any proposed plan of compensation for all industrial accidents would not be an excessive burden upon the industries, is a question that can only be answered after an exhaustive study of the statistics with reference to accidents and the relation which compensation for those accidents under the proposed plan would have to the employer's business. This as far as the employer is concerned is the manner in which the question of rate of compensation must necessarily be finally determined in the opinion of your committee.

In considering the sufficiency of the rate of compensation from the standpoint of the employe, regard should be had to what is now paid on the average to employes meeting with injuries in industrial accidents. The New York commission made an extended investigation into this branch of the subject, and a brief summary of their findings is set forth in Bulletin 90 of Bureau of Labor, page 693. In connection with the objection that a small proportion of the workmen injured by accidents of employment get substantial compensation, the commission investigated 181 cases in which married men lost their lives in industrial accidents in 1907 and 1908 in Erie county, in the borough of Manhattan. Of this number it was found that the families received nothing in 56 cases; that they received $100 or less in 12 cases; from $101 to $500 in 52 cases, from $501 to $2,000 in 19 cases, more than $2,000 in 12 cases, while suits were pending in 30 cases, so that in 79 per cent of the closed cases the families received $500 or less, and in only 7.9 per cent of such cases did they receive more than $2,000, or an amount equal to three times the average yearly earnings of the workmen considered. An investigation of 1,040 work accidents by the state labor department, in which total losses and payments were ascertained, showed that in 404 of the 902 cases of temporary disability (lasting from one week to more than one year) nothing was received by the injured person, not even medical expenses; while in 304 cases the amount recovered from the employer was less than one-half the loss of wages and expenses of the injury. In 71 cases there was permanent partial disability, reducing the earning capacity of the employe in varying amounts. Of this number 18 received nothing, 22 received $100 or less, 14 received from $101 to $500, 5 received from $501 to $2,000, while one person received more than $2,000; suits were still pending in 11 cases. In 902 cases of temporary disability there was a wage loss of $66,800, besides medical expenses amounting to $20,000, while all payments by employers amounted to but $25,339, or less than 30 per cent of the losses and costs. Payments in cases of permanent partial disability made a somewhat better showing, approximating 34 per cent of the actual losses, though this omits from consideration the depreciated earning power; while in 10 cases of permanent total disability, computed on a basis of three years' wage loss, the payments by employers amounted to but 9.7 per cent of the losses and costs. Data obtained from other sources indicate the same general condition of inadequate compensation for losses suffered.

PRESENT SYSTEM UNJUST AND INADEQUATE.

The present system of compensation for industrial accidents is now conceded to be unjust, inadequate, unsatisfactory and wasteful. It is proper, therefore, to consider what the present system is, and then to consider and suggest a remedy which will be equitable and just to both the employer of labor and his employe.

That the system of liability and damage suits entails waste is shown by the fact that the expenditures of 327 firms in the state in 1907, employing 125,995 men, amounted to $192,538 on account of accidents, accident insurance, legal expenses, etc., of which the amount paid to the persons injured was but $104,643, or 54 per cent of the employers' outgo in this connection. Premium receipts and payment of losses by nine insurance companies that keep separate accounts of their employers' liability business show that during 1906, 1907 and 1908 they took in as premiums $23,523,585 and paid out in insurance $8,559,795, or but 36 per cent of the premiums received. In connection with attorneys' fees, which are frequently contingent on recoveries, it was shown that in 14 of the 51 cases investigated the fee was less than 25 per cent of the recovery, in 14 cases it was 50 per cent or more, while in the remaining 23 cases it was more than 25 per cent and less than 50 per cent.

The question of the cost to the employer of a compensation system as compared with the cost of the present system received consideration, the investigation of this phase of the question being conducted by the state bureau of labor statistics. Data were secured from 52 firms, employing about 29,000 persons, from which a comparative study was made, showing the actual cost of accidents during the year 1907, and the cost under a compensation scheme which allowed three years' earnings in case of death and half earnings during disability, making up the loss of wages where partial disability reduced the earning capacity. From the results of this investigation the report concludes that "even with the most liberal allowances for possible understatement on the cost of compensation side, it is impossible to interpret the figures as affording anything but very strong evidence that large manufacturing concerns could pay compensation on such a scale as that here used, which is fully equal to the present English system, at no greater cost than many of them are now actually incurring for accidents, and probably in some cases for less." It is assumed that this conclusion should not be made to apply to small employers.

Contribution to Fund by Employes.

While there are the strongest reasons in favor of the contribution on the part of the employe to the fund out of which the workingmen's compensation is to be paid, a recent research by legislative commissions or other parties has disclosed no way in which this may be brought about by legislative enactment. It is recognized that such a scheme would be advisable for the reasons that it would remove from such schemes all idea of charity and would put the employe on a basis of independence with reference to workingmen's compensation. Such scheme would also be conducive to the exercise of care on the part of servants knowing that while the injured person would be compensated under the system, part at any rate of the cost of the accident would fall on the employe generally. It is further believed that it would reduce the element of fraudulent claims and simulation of injurious effects and malingering for the reason that honest and conscientious employes having a personal interest in the fund by reason of their contribution thereto, would be on the lookout for such cases of fraud and malingering. It is true that this principle is enacted into the Montana law above mentioned, but it is the opinion of those who have given consideration to the subject that the provisions of the Montana law will not stand the constitutional tests and that when the question is brought before the supreme court of that state the act will be held unconstitutional.

While it may be true that our courts will come in time to relax their views on this branch of the subject, in the present state of the law, it would be fatal, in the opinion of your committee, to any such law to incorporate that element as a compulsory feature, and so in any

bill that is framed, if the idea of contribution by the employe is to be incorporated at all it must be done in such a way that it is accomplished by the consent of the employe. In other words, it must be left as a matter of contract between the employer and the employe.

The classification of industries both by state and federal laws and judicial decisions is discussed, and then the committee offers its views as what may be done toward harmonizing these opinions of courts and legislatures:

The Remedy.

In view of what is desired to be accomplished and the peculiar constitutional restrictions and limitations obtaining in the various states, what legislative action, if any, is advisable?

It seems to be the conclusion that any safe legislation, although perhaps compulsory in form, must be elective in fact and should embrace all industries, although it might be that a limitation of the application of the act to industries employing more than a specified number of men would meet with judicial approval.

A bill, "compulsory in form, but elective in fact" would mean a bill providing for the payment of compensation for all industrial accidents upon the basis of the scale to be included in the act, such bill, however, to reserve to both employer and employe their rights at common law, but providing as to the employer that, if he pursue his common law remedies and refuse to make settlement of compensation under the act, his common law defences shall be limited (the limitation to be fixed by the act) and with the further proviso as to the employe that he shall be presumed to have accepted the compensation plan unless he expressly contracts to the contrary; and that any acceptance by him of compensation at common law shall bar him from all benefits to the compensation provided in the act. Or it might be made elective in form, with the same penalties to follow an election not to pay the compensation provided.

At this point the committee says:

We wish to present for your consideration, a suggestion that voluntary associations be organized in the different National Metal Trades Association districts, each member to contribute his fair proportion to a compensation fund of such a size to properly take care of all accidents and sickness among the employes. In this way we could do away with the necessity for legislation and soon quiet the demand for it.

Conclusion.

The conclusions of the committee are embodied in the following paragraphs, which are followed by the presentation of some interesting data obtained in answer to a series of written inquiries to about 200 manufacturers scattered throughout the country:

It is obvious that nothing in the way of reform can be accomplished without an honest effort both on the part of employers and employes to that end, and in view of the fast forming public sentiment in favor of more uniform and equitable laws governing the relation of master and servant, and the liability for the right to compensation for personal injuries growing out of that relation, we believe that such reasonable legislation as may be the result of such effort will be given that construction by the courts that is in furtherance of the plan, and in the interest of the common good, without too great an adherence to the technical construction of the present law relating to the subject.

While it might seem desirable for this committee to compile a bill which would secure the approval of the association, it would certainly be very difficult to perform this task in a way which would be acceptable to various states of the country in which the membership of the association is found. The essentials have been dwelt upon in this report, and are generally covered in the several bills which are being considered by state commissions, or in some cases have been presented for legislative action. The committee therefore is content with referring, as appendices to this report proposed bills in Illinois, Minnesota, Ohio, Wisconsin, etc.

In conclusion your committee members will say that they are inclined to favor, if it is possible adequately to secure it, a provision in the acts adopted by the several states for a contribution by the employe to the cost of compensation, not so much for the purpose of relieving the employer of a part of the cost, as for the purpose of enhancing the amount of compensation to be paid beyond what is now recognized as a fair proportion to be borne by the employer in any event, and for the purpose of giving to the employe that independence and that interest in the operation of the proposed law which would come solely from the fact that the compensation was furnished in part by his own contribution.

Such a provision is highly desirable, but under the law in all probability must be provided for by contract between the employer and his employe; and any act dealing with this relation should be so framed as to recognize and encourage the making of such provisions, and when so made, under the control, however, of some proper state authority, they should supersede the statutory provisions and stand also in lieu of the common law rights and obligations.

In finally submitting the report the committee adds:

It will be noted from the answers to question "6," that where membership is voluntary, only 57 per cent of the employes join, and it is very common in case of accident or sickness to an employe who is not a member to have a subscription paper passed around in the shop. This is very unsatisfactory and unfair to the men who are paying dues to the insurance association. Compulsory payment, by bringing in all the men, makes the cost per man very much less and enables the association to extend the benefits.

It is suggested, as the belief of one manufacturer, that the whole employer's liability agitation is a direct movement toward socialism. If this be true, it is high time that all employers of labor were co-operating in a general effort to formulate some uniform policy or system, which shall be elastic enough to operate equally well for all manufacturers, large and small, and so safeguard and protect the mutual interests of employer and employe, as to satisfy both.

Accompanying the formal report, but printed separately, is a completed compensation law which it is suggested that state legislatures act upon.

Practical Training of Apprentices*

The necessity of training apprentices is as much of a live question today as it has been at any time in the history of the metal trades. The reasons why they should be trained and the obligation resting upon manufacturers to train them have been brought to your attention so many times that your committee feels it is not necessary for them to dilate upon this phase of the question. What we would like to do is to have you interest yourselves in the question to such an extent that you will do something toward recruiting the ranks which have become so much depleted during the last four or five years, and do it now.

We may sit here and discuss this question, giving various accounts of our experiences upon the matter, and yet, if we do nothing more than this what does it amount to? The time is present when active efforts should be made to a much larger extent than is now apparent toward accomplishing these results, not by a few of the leading concerns but by all; it must be everybody's affair.

Since your committee was first appointed, there has been such a trend given the training of apprentices that we think some of us can well stop and wonder if we are not paying too much attention to the technical education rather than to the manual training of

*Report of apprenticeship committee, E. P. Bullard Jr., chairman, Wm. A. Viall and R. K. LeBlond, to National Metal Trades Association's annual convention, New York, April 12 and 13.

our apprentices. For your committee to deprecate rational class-room work would be hypocritical and false, to say nothing of being old-fashioned. Give the boy school-room work as far as it may be deemed advisable, but don't give too much time to it at the expense of the manual training. The time has long passed when it is enough to sign a boy, and then inform him, as a man in charge of a hardening room informed his successor some 25 or 30 years ago: "Here is the coal; there is the leather; the furnace stands in the corner; the rest is in the air." It is necessary that systematic work be done in the instruction of the apprentice; work should be carefully laid out in a manner to give him progressive training. His mental training should also be attended to. But it may be there are cases where it would be fully as profitable to the young man and the community if less educational work were tried and more attempted in the way of direct mental teaching. We are all acquainted with the lawyer and the physician who have been trained to such a fine point that they know all of the works of authorities who have written regarding their profession, and yet when they come actually to try a case or to attend a patient we must lift up our hands and cry "heaven defend."

Skill in the metal trades can be obtained only by actually doing the work, and there must be a continued repetition of such work to bring success, as in the case with the surgeon who becomes successful and skilled through oft repeated operations.

Where public agencies, like the public school, industrial school, Y. M. C. A. classes, etc., can be taken advantage of to furnish the school-room work, it is possible for the manufacturer to co-operate with them and attend to teaching the manual labor alone. While there are cases where it is not possible for the manufacturer to provide any technical training, he should not use this as an excuse for not taking on apprentices.

The purpose of training an apprentice is to make him a skilled workman, and according to the trend of the trades at the present time where specialization is becoming so pronounced, it is a case of training workmen to become so skilled in their work that they can readily take under their charge and impart to others that knowledge of their skill which makes these other men, men who are not able to become completely educated, best skilled in the class of work that they have to do. There are cases of men who have a varied technical education with but little manual training, who are making most successful leaders of men; but where one such man as this is required, hundreds are demanded who must give not only of their technical knowledge but of their skill acquired by manual labor oft repeated.

We would not advocate any system of training which would have for its ulterior end the working of a man into a groove from which he could not escape. This is farthest from our thought; but we would have him win his way out through the application of that skill, by his ability to command; no, not command but lead others into lines of work which eventually would much better their condition.

It has been advocated on this floor previously that the best training that could be given to apprentices in shops was by having some one person delegated to counsel that training. Not only should this person have charge of the class of work that the young man should do, as well as place him in various departments of the works, but he should also have some opportunity to influence the intellectual and outside life of the young man. As has been said before, all shops are not large enough to afford paying a man to do this and nothing else; but there is no shop so small but that one of the journeymen could be detailed to give some portion of his time to the training of such young men. We are aware that we must advocate a system of apprenticeship that will apply to the majority of the owners of shops, and the majority does not consist of large but medium and small-sized shops. And so we hope that as you consider this work you will not pass it over and say that "it is good for my neighbor; it does not fit my case; I am too small;" but that you will take it earnestly enough to see wherein you must modify it so that it will exactly fit your conditions.

Last year we submitted a report indicating the lines upon which we would recommend apprentices to be taken on, using, as a basis, the contract that has long been in use by the American Tool Builders' Association. Copies of this document are here today and will be sent to all of the members. The National Machine Tool Builders' Association, through its committee, has readily agreed to our using copies of its forms, and we thank the association at this time for giving its consent. In this document you will find noted various suggestions as to hours, compensations, etc., but we would call your attention to the fact that these are but suggestions to be modified and to be varied as the local conditions may require.

We recommend that you use copies of such documents in your establishments modified to meet your wants, and that you make an agreement that will bind your apprentice to you; and, after they shall have completed their term, that you make use of a diploma, which this association can furnish, to be signed by our president. Or, if you prefer, get out for yourself such a document, to be signed by your own officials.

When you have admitted the apprentice, do your part thoroughly in educating him and give him such instructions as you are best able to give him. Bind him to yourself, not only by such a paper as we are indicating, but by that stronger element, the element of sympathy and co-operation. Welcome the boy's approach to you to talk over and discuss with you some of his problems and troubles; and when you have done this you will have built up for yourself a coterie of followers who, if they do not remain with you, are thoroughly equipped to carry on to future aspirants for training the same kind of work that you have done.

Officers to be Elected.

Following is the ballot prepared by the nominating committee of the National Metal Trades Association to be voted at the thirteenth annual convention at the Hotel Astor, New York City, April 13:

President—F. C. Caldwell, H. W. Caldwell & Son Co., Chicago.

First vice president—Henry D. Sharpe, Brown & Sharpe Mfg. Co., Providence.

Second vice president—W. A. Layman, Wagner Electric Mfg. Co., St. Louis.

Treasurer — Howard P. Eells, The Bucyrus Co., S. Milwaukee.

Councillors for two years — J. H. Schwacke, Wm. Sellers & Co., Inc., Philadelphia; C. Bermingham, Canadian Locomotive Co., Ltd., Kingston, Ont.; L. H. Kittredge, The Peerless Motor Car Co., Cleveland; W. H. Vandervoort, Root & Vandervoort Eng. Co., E. Moline, Ill.; A. E. Newton, Prentice Bros. Co., Worcester, Mass.; P. O. Geier, The Cincinnati Milling Machine Co., Cincinnati.

Councillor to serve unexpired term — Stevenson Taylor, Quintard Iron Works, New York City.

COKE PRODUCTION

In 1909 According to Latest Government Report.

The combined production of beehive and retort oven coke in the United States in 1909 amounted to 39,315,065 short tons, valued at $89,965,483, against 26,033,518 tons, valued at $62,483,983 in 1908. The increase in 1909 over 1908 was 13,281,547 short tons, or 51.02 per cent in quantity, and $27,481,500, or 43.92 per cent in value. Notwithstanding this increase of over 50 per cent in the production of coke in 1909, the output was still 1,464,499 tons, and $21,573,643 below the high record of 40,779,564 short tons, valued at $111,539,126 in 1907. Attention is called to its general decline in value throughout the United States and the same is true of the product from the coke ovens. From the high record of $2.74 per ton, made in 1907, the price declined to $2.40 in 1908 and to $2.29 in 1909. The decline of price in both coal and coke was due to the somewhat demoralized condition of the iron market during the first half of the year. Of the total production in 1909 of 39,315,065 short tons, 33,060,421 short tons, or 84.09 per cent, were produced in beehive ovens, and 6,254,644 short tons, or 15.91 per cent, was the output of the by-product retort ovens.

The quantity of coal consumed in the manufacture of coke in 1909 amounted to 59,354,937 short tons, valued at $62,203,382. The value of the coke produced from this coal was $89,965,483.

1909.

Alabama	43	10,061	0	5,080,764	60.7	3,085,824	$8,068,267	$2.61
Colorado[a]	16	3,846	0	1,984,985	63.1	1,251,805	4,135,931	3.30
Georgia	2	350	0	86,290	53.8	46,385	159,334	3.44
Illinois	5	468	40	1,682,122	75.9	1,276,956	5,361,510	4.20
Kansas	6	67	0	0	.....	0	0	.....
Kentucky	6	494	0	89,083	52.0	46,371	101,257	2.18
Missouri	1	4	0	0	.....	0	0	.....
New Mexico	4	1,030	0	694,390	53.9	373,967	1,099,694	2.94
Ohio	7	447	49	340,735	65.4	222,711	683,155	3.07
Oklahoma	5	536	0	0	.....	0	0	.....
Pennsylvania	283	54,506	2,072	36,983,568	67.3	24,905,525	50,377,035	2.02
Tennessee	16	2,729	0	493,283	53.1	261,808	667,723	2.55
Utah	2	854	0	(b)	.....	(b)	(b)	.....
Virginia	19	5,469	100	2,060,518	65.4	1,347,478	2,415,769	1.79
Washington	6	285	0	69,708	61.7	42,981	240,604	5.60
West Virginia	138	20,282	126	6,361,759	62.0	3,943,948	7,525,922	1.99
Indiana								
Maryland								
Massachusetts								
Michigan								
Minnesota	20	2,553	563	3,427,732	73.3	2,509,306	9,129,282	3.64
Montana								
New Jersey								
New York								
Wisconsin								
Total	579	103,982	2,950	59,354,937	66.2	39,315,065	89,965,483	2.29

[b] Production included with Colorado.

Foreign Rail Trade

The chief event of the week has been the prolongation of the Rail Trade Association, regarding which some doubts have lately been expressed owing to friction which had arisen. The difficulties have, however, been surmounted safely. The only business of which we have heard is the placing of a small lot of tram rails for Dunedin, N. Z., with the North Eastern Steel Co. The following are new inquiries: 10,000 tons to 11,000 tons for Mombassa and 1,700 tons for Lourenco Marques. The Southern Siamese inquiry for 20,000 tons which has been in abeyance for a long time is likely to come before makers again at an early date. We understand that an English syndicate, in which, however, Belgian capital is interested, are to construct a railway from Vera Cruz (Mexico) to Campeachy, the line being 725 kilometers long.—The Ironmonger, London.

Works Taken Over

The Ohio-National Mfg. Co., a newly organized company, has taken over the plant of the Logan Construction Co., Chillicothe, O. The new concern advises that it will take up the manufacture of a number of small machine tools, including a bench drill with standard drill jig attached. Later on the manufacture of a gasoline motor will be taken up.

The new shops of the Louisville & Nashville railway at Boyles, Ala., are nearing completion and will probably be occupied within the next 60 to 90 days. This plant when complete will cover some 60 acres and represent an outlay of approximately $700,000.

At a recent meeting of the Virginia Pig Iron Association it was reported that stocks have decreased and shipments are being more freely made. A more hopeful feeling for improvement in the later spring developed.

May Turn Toledo Mill Into Car Shops

The Pennsylvania railroad contemplates equipping the old Toledo rolling mill of the Republic Iron & Steel Co., which property the Pennsylvania recently purchased, for use as repair and car shops.

A contract has been let to the A. Q. Thachter Contracting Co., of Toledo, to install a private intake at the plant of the Ford Plate Glass Co., which is expending $1,000,000 on improvements this year. The contract calls for 500 feet of 48-inch cast iron pipe amounting to 165 tons, to be furnished by the Massillon Iron & Steel Co., Massillon, O.

Duluth & Iron Range Earnings

The Duluth & Iron Range railroad has reported to the Interstate Commerce Commission for February and eight months as follows:

	1911.	1910.	Decrease.
Feb. tot. op. rev.	$ 138,311	$ 106,720	*$31,591
Oper. inc.	55,954	87,698	31,744
Eight months tot. op. rev.	5,365,799	6,683,961	1,318,162
Oper. inc.	2,839,141	4,023,963	1,184,822

*Increase.

Ingersoll-Rand Report

The Ingersoll-Rand Co. reports for the fiscal year, ending Dec. 31 last, as follows:

	1910.	Increase.
Earnings	$1,646,145	$413,799
Depreciation	415,316	*11,464
Interest on bonds	100,000	
Special reserve	315,000	315,000
Total deductions	830,316	303,536
Bal. for dividends	$ 814,829	$110,263
Dividends preferred	287,988	
Surplus balance	$ 526,841	$110,263
Common dividends	149,995	149,995
Surplus	$ 376,846	*$ 39,732
Previous surplus	1,401,325	416,578
Profit and loss surplus	$1,778,171	$376,846

*Decrease.

The Pittsburg office of Vivian Bond & Co., dealers, ferro-alloys, pig iron, etc., was abolished March 31. A. C. Daft, who had been resident manager of the Pittsburg office for the past three years, has opened an office at 2502 Oliver building, Pittsburg, and will engage in business for himself, handling pig iron, coke, ferro-alloys, etc. Mr. Daft was previously identified with Daft, Heyward & Co., Pittsburg, and was also connected with the Pittsburg office of Hickman, Williams & Co.

The Pittsburg Machine Tool Co. expects to move into its new quarters at Braddock, Pa., about May 1. The new building, which covers an area of 100 x 217 feet, is of brick construction with concrete floors.

COMMITTEE

Named to Take Charge of George W. Jackson, Inc., of Chicago.

For George W. Jackson, Inc., one of the largest structural steel contractors in the west, a creditors' committee has been appointed to take charge of its affairs and avoid bankruptcy proceedings, if possible. The floating debt of the company is estimated at approximately $1,000,000 and the total liabilities, including stock and bonds, are $5,000,000. The assets are roughly estimated at $5,500,000. The members of the creditors' committee are: Ira M. Cobe, representing Cobe & McKinnon, who have loaned considerably in excess of $100,000 to the embarrassed corporation; David N. Barker, of Jones & Laughlin, which has an unpaid bill amounting to about $40,000, for structural steel; Herman Waldeck, of the Continental & Commercial National bank, a creditor to the extent of $100,000; John B. Russell, of J. B. Russell & Co., a New York firm, to which was intrusted the floating of the recent bond issue, and Lewis M. Freedman, of Joline, Larkin & Rathbone, lawyers, representing New York interests.

The immediate cause of the company's difficulties is its failure to raise additional liquid capital through an issue of $2,000,000 in new stock. The letter from the creditors' committee to the various unsecured creditors states that the company is solvent but that its working capital, which should be available for current business, is largely tied up in extensions made to its plant, including real estate, buildings, equipment, and in reserved payments held back under unfinished contracts. The company's notes for large amounts are overdue and unpaid and it lacks sufficient funds to complete economically its existing contracts.

It is the purpose of the creditors' committee to continue to operate and endeavor to extricate the company from its difficulties, providing a temporary loan to cover the urgent financial needs. The company has a number of large contracts under way at the present time, including moving the posts under the elevated loop in Chicago and building the Catskill aqueduct near Yonkers, N. Y.

The April meeting of the Chicago Foundry Foremen's Association was held at the Great Northern Hotel, April 8. A paper was read on core making and a model of the Gow core machine was exhibited. John Gow of the General Electric Co., Schenectady, N. Y., inventor of the core machine, was present and assisted in demonstrating the working of the model. The Chicago Foundry Foremen are planning to go to Pittsburg to attend the convention in May, in a special train.

Ship Yards Near Buffalo Taken Over

The Canadian General Electric Co., Ltd., Peterborough, Ont., has acquired the plant of the Canadian Ship Building Co. on the Niagara river just below Bridgeburg, on the Canadian side opposite Buffalo. A year ago shareholders of the General Electric Co. were advised that it had become necessary to increase the capacity of the structural steel department and that negotiations were then pending for the acquisition of a suitable location for the extension of that department. In furtherance of this policy the company has leased the lands and plant of the ship building company near Bridgeburg, which are admirably suited for this purpose. While the transaction is in the nature of a lease, the company takes the plant in the same way as the hydro-electric plant at Nassau was taken over some years ago.

Reorganization Bid Rejected

Judge Holt, of the United States district court, at New York, has rejected a bid recently made by several bondholders and creditors of the J. B. & J. M. Cornell Co., structural iron and steel contractor, which was part of an attempt to effect a reorganization. The bidders represent claims aggregating $225,000. The court based its rejection upon the ground that no provision for compensation of the receivers was made; that it cannot compel non-assenting creditors to accept 25 per cent of their claims payable two years hence, as provided in the bid; and that full compensation is not provided for those who have furnished labor, materials, etc., to the receivers.

Harbison-Walker Refractories Co. has declared the usual quarterly dividend of 1½ per cent on preferred stock, payable April 20.

J. G. White & Co., New York, have declared the regular quarterly dividend of 1½ per cent on preferred stock, payable May 1.

BUILDING ADDITIONS

To Several Indianapolis Plants, Others Re-locating.

Indianapolis, April 11.

The Hetherington & Berner Iron Works, which has been located in East South street, is erecting a new plant in Kentucky avenue, near White river. The company has received a permit to erect a machine shop, 100 x 200 feet, to cost $25,000, and a storage house, 30 x 150 feet, other buildings to follow. The new plant will occupy about four acres. Founded in 1867, the company is now in the hands of the third generation of both of the founders of the company. It was originally conducted as a partnership, but was incorporated in 1883. F. A. Hetherington, son of one of the founders, is now president of the company, and his son, C. F. Hetherington, is chief mechanical engineer. Frederick Berner, also the son of one of the original founders, is vice president, and his son, Robert Berner, is secretary.

The Nordyke & Marmon Co. is erecting a building, 100 x 200 feet, to make more room for its automobile and mill machinery departments. The company is planning to increase its automobile output to 1,000 machines in 1912, which will be the largest in the history of the company.

The Link-Belt Co., at Michigan street and Holmes avenue, has just completed a new building, making four large buildings, now included in the plant. It is three stories, 96 x 155 feet, of fireproof construction. The new building has 30,000 square feet of floor space.

At sheriff's sale, the Service Motor Car Co., of Kankakee, Ill., has purchased the machinery of the Standard Auto Co. of America, at Wabash, and will move to Wabash. The Service company has been incorporated under Indiana laws with an authorized capitalization of $500,000.

Pipe Award:—The contract for furnishing all cast iron pipe for the municipal water works department at Milwaukee, Wis., has been awarded to the United States Cast Iron Pipe & Foundry Co. The contract price for the pipe is $24.65 per ton and $50 per ton for castings. The price for pipe is $1.75 lower than last year.

At a meeting of the creditors of the Central Foundry Co. at New York, April 6, Waddill Catchings, the receiver, was unanimously elected trustee with a bond of $50,000. Several hundred claims were filed by the reorganization committee and by other creditors.

Passage of Laws for Workmen's Compensation

Favored by Triple Convention of Supply and Machinery Dealers and Makers at Louisville—Alleged Encroachment of Manufacturers Resented

The joint convention of the associations of the Southern Supply and Machinery Dealers, the American Supply and Machinery Manufacturers and the National Supply and Machinery Dealers, held in Louisville at the Seelbach Hotel, from April 3 to 5 inclusive, was in many respects the most successful and noteworthy meeting ever held by any of the three associations. Previously the Manufacturers' Association has held a separate convention each year with both the northern and the southern jobbers' associations, entailing upon the members of the Manufacturers' association considerable extra expense as well as the expenditure of a week additional time. Held as an experiment, the triple convention worked out so satisfactory that it will be made permanent. Instead of holding the convention on the last three days of the week, the first three were taken, enabling a majority of the delegates present to put in at least two days of the convention week at their desks in their own plants. About 80 sisters, mothers, wives and daughters attended the convention. The program for their entertainment was as carefully considered and arranged for as any part of the schedule. The citizens of Louisville took it upon themselves to entertain the ladies during the day, leaving the delegates free for the work of the convention.

The general program, both entertainment and business, is arranged by a committee composed of Major W. H. Banks of the Banks Supply Co., Huntington, W. Va., acting for the Southern association, Thomas A. Fernley, secretary of the National association, and F. D. Mitchell, secretary of the Manufacturers' association, acting with R. S. Brown of the Publicity League of Louisville and C. H. Jenkins of the Moran Flexible Steam Joint Co., of Louisville.

At the opening session on Monday forenoon, the three associations were welcomed by Gov. Augustus E. Wilson, William Heyburn, of the Louisville Business Men's Club, and Pendelton C. Beckley of the Board of Public Safety. Edward C. Hinman, W. M. Pattison and S. P. Browning responded for their respective associations. In the afternoon at separate executive sessions, the work of the convention was begun. The secretaries of the two supply and dealers' associations reviewed the work of the year in detail.

New Members.

Alvin M. Smith, of the Southern association, pointed out that while it had added 11 new members during the year past, giving it a total membership of 93, there are still about 50 firms in the south that should be members. While business is not yet normal, the indications are that 1911 will be better than 1910. Cast iron and malleable fittings are in worse shape than last year. Many jobbers approve of placing them on a piece list. Considerable discussion centered around one cent letter postage, the secretary pointing out the losses on second class matter and the profits on first class matter.

Secretary Smith said in part: "I think most of us will agree that the subject of co-operation is as good a one as can be discussed at the present time. It would be entirely presumptuous for me to advise any of you how to conduct your business, as I have not had the experience necessary for your particular line, but organization and co-operation are facts we cannot get away from. They mean economy in distribution and efficiency in executive direction, by the application of these ideas and the confidence in your fellow competitors which comes through the free business intercourse of compact organization. Organization gains for us the respect and consideration of the manufacturers, who would not, in many cases, consider our requests for fair resale prices and protection. Business is no longer conducted along lines of unbridled competition, but on scientific principles of distribution, based on the cost of marketing products of the country. Nothing can stop the growth of or prevent the spread of industrial federation."

During the separate sessions, numerous business problems were discussed. "The Proper Method of Compensating Traveling Salesmen" was led by E. Howard Smith, of the Superior Supply Co., who pointed out the need of a uniform system that would be fair to both the salesman and the employer. "The Cost of Doing Business and the Proper Method of Handling Expense Items" was discussed by W. P. Simpson, of the C. T. Paterson Co., pointing out the narrow margin of profit for the jobber and giving a classification of expenses for the jobbing trade.

The National Supply and Machinery Dealers took up the matter of manufacturers' competition very thoroughly with discussions of "Cost of Doing Business," "Manufacturers' Competition," "Illegitimate Competition," "Unintelligent Competition" and "Price Rebates."

Secretary Thomas Fernley pointed out that manufacturers' competition was injuring the jobber and asked that the work of establishing resale prices on goods which now bear no resale price, be considered most seriously. He pointed out that the cost of distribution of staple lines was:

	Per cent.
Mill supplies	14.49
Machinery and supplies.....	13.51
Machinery	11.26

This leaves the dealer only a small differential above the cost of the goods. Continuing he said:

Our members are ready and willing at all times to contend for a business with those who purchase their merchandise on the same basis as they do themselves. These are days when special concessions and undue advantages are being tabooed, and in view of this, it seems most unfair that the dealer should be forced to compete with the man that makes the goods. The members of this association during the past year have called our attention to most flagrant abuses of their rights by manufacturers.

Manufacturers have sent missionaries with dealers' salesmen to promote the sales of their product. They have compiled a list of all users of certain goods. Then after this information has been secured, possibly they open up a branch warehouse and handle the trade direct and leave Mr. Dealer high and dry with only some of the smallest class of consumers as his customers.

We have reported to you many cases of manufacturers who depend upon the members of this association for the tonnage business; for the business which they must have to run their factories properly, and who are so unfair as to sell the consuming

trade at prices which the jobber cannot profitably meet.

We hope that this tendency on the part of the manufacturers to withdraw protection from the dealer, to take the dealer's trade away from him in whole or in part, will meet with the hearty disapproval of the members of this association.

We report the consensus of opinion as above to you, and respectfully await your instructions as to procedure during the coming association year. The evil is a great one and must be curbed.

Resale Prices.

In pursuance with the work which this association has done over a period of years on the resale price question, we have continued to take this matter up with the manufacturers, both asking for the establishment of resale prices on goods which bear no resale price and asking for increase in the differential where a resale price is already established, but where the margin of profit is inadequate.

What success has attended the work of this association in this connection, is best evidenced by the arrangements of which you have been advised during the past year, both direct by this office and by the various manufacturers with whom we have corresponded.

Our members comment on these resale prices favorably, but deplore the fact that the manufacturer does not make the differential sufficiently large.

We have continued to call the attention of the members to the unprofitable quotations in mail order house catalogs. These quotations have been called to the attention of the manufacturers by the members with resultant good effects. The catalogs of such houses today show a decided change for the better. Manufacturers' standard brands have largely been eliminated and in their place are shown private brands and nondescript goods on which prices can be met with certain low qualities of goods in our line.

Officers and committees for the next year are as follows:

AMERICAN SUPPLY AND MACHINERY MANUFACTURERS' ASSOCIATION.

President, Willard Parker, Pennsylvania Shafting Co., Spring City, Pa.; first vice president, N. A. Gladding, E. C. Atkins & Co., Indianapolis, Ind.; second vice president, P. K. Swartwout, The Ohio Blower Co., Cleveland; third vice president, C. K. Jenkins, Moran Flexible Steam Joint Co., Louisville, Ky.; secretary-treasurer, F. D. Mitchell, 309 Broadway, New York City.

Executive committee: W. H. Fisher, chairman, T. B. Wood's Sons Co., Chambersburg, Pa.; E. A. Ludden, Detroit Oak Belting Co., Detroit; J. E. Osgood, J. M. Carpenter Tap & Die Co., Pawtucket, R. I.; John W. Macomb, New York Belting & Packing Co., New York City; R. K. Hodgkins, Jenkins Bros., New York City.

SOUTHERN SUPPLY AND MACHINERY DEALERS' ASSOCIATION.

President, W. P. Simpson, C. T. Patterson Co., New Orleans; first vice president. S. M. Price, S. M. Price Machinery Co., Norfolk, Va.; second vice president, I. F. Young, Young & Varm Supply Co., Birmingham, Ala.; secretary and treasurer, Alvin M. Smith, Smith-Courtney Co., Richmond, Va.; Executive Committee, J. G. Belding, Lombard Iron Works & Supply Co., Augusta, Ga.; H. C. Clark, Charlotte Supply Co., Birmingham, Ala.; W. E. Mills, Mills & Lupton Inc., Chattanooga, Tenn.; J. G. Barkley, Knight & Wall Co., Tampa, Fla.; Manufacturers' and Conference Committee: W. H. Banks, chairman, Banks Supply Co., Huntington, W. Va.; J. M. Tull, John G. Christopher Co., Jacksonville, Fla.; J. E. Thatcher, Briggs, Weaver Machinery Co., Dallas, Texas.

Membership committee: Geo. P. Darby, chairman, The Fox-Harris Machinery & Supply Co., Pine Bluff, Ark.; Jas. Biggs, Hardwicke-Etter Hardware Co., Sherman, Texas; Marshall Turner, Turner Supply Co., Mobile, Ala.

Textile committee: D. G. Morten, Carolina Supply Co., Greenville, S. C.; H. C. Clark, Charlotte Supply Co., Charlotte, N. C.; F. M. Glover, Textile Mill Supply Co., Charlotte, N. C.; J. R. Whitman, Cotton States Belting & Supply Co., Atlanta, Ga.

NATIONAL SUPPLY AND MACHINERY DEALERS' ASSOCIATION.

President, W. L. Rodgers, The Pittsburg Gage & Supply Co., Pittsburg; first vice president, Henry Prentiss, The Prentiss Tool & Supply Co., New York City; second vice president; J. O. Harron, Harron, Rickard & McCone, San Francisco; advisory secretary-treasurer, T. James, Fernley, Philadelphia; secretary-treasurer, Thomas A. Fernley, Philadelphia.

Executive committee: W. T. Todd, Somers, Fitley & Todd Co., Pittsburg; M. B. Barkley, The Cameron & Barkley Co., Charleston, S. C.; Chas. S. Farquhar, The Chandler & Farquhar Co., Boston; George Vonnegut, Vonnegut Hardware Co., Indianapolis.

Employers' Liability.

The American Manufacturers, contrary to past custom, presented no prepared papers, but carried on an open and general discussion through the meetings. The employers' liability and employes' compensation bills now pending and recently enacted in some 15 states were thoroughly and earnestly considered. Among the men who participated in the discussion were John Trix, American Injector Co.; Edward C. Hinman, American Steam Pump Co.; C. E. McFarlan, the W. Powell Co.; J. E. Osgood, of the J. M. Carpenter Tap & Die Co.; M. W. Mix, Dodge Mfg. Co.; Henry B. Lupton, Oliver Steel & Iron Co., and Willard Parker, Pennsylvania Shafting Co.

The consensus of opinion was that both laws should be enacted at the same time and that they should be framed to avoid the expense now entailed in obtaining settlement for injuries by a civil suit, so that the injured man would receive the compensation due him and at the same time the ambulance hunting lawyer and the usual long drawn out law suits would be eliminated. The German compensation laws were fully discussed, it being pointed out that to make any compensation for injuries effective and just, the workmen, as well as the employer, must contribute a certain part toward the fund, to make the workmen feel some responsibility for their fellow workmen. It was generally admitted that while in past years employers have been somewhat unjust in a few cases, the pendulum is now swinging the other way, and the manufacturer is being held for more than his share. All agreed that the manufacturers should and must act together, so that they can go to the legislatures of the various states and secure the passage of fair and humane laws for the common good of themselves and their employes. The Manufacturers' association is growing rapidly and receiving many applications for membership, which enables it to enlarge its sphere of influence and power.

No formal banquets were held. Receptions, dancing, luncheons, vaudeville, smokers, theater parties, and an excursion to the Mammoth Cave on Thursday provided an enjoyable and varied program of entertainment that was appreciated by all.

Those in Attendance.

The following delegates were registered at the association headquarters:

A. M. Nichol, American Blower Co., Detroit.
P. L. Barter, Cord Mfg. Co., Detroit.
J. J. Hughes, Quaker City Rubber Co., Philadelphia.
Thomas A. Fernley, Sec.-Treas. National Association, Philadelphia.
T. J. Fernley, Advisory Sec. National Association, Philadelphia.
Henry B. Lupton, Oliver Iron & Steel Co., Pittsburg.
Dilworth R. Lupton, Oliver Iron & Steel Co., Pittsburg.
A. M. Lally, National Tube Co., Pittsburg.
C. T. Johnston, Republic Iron & Steel Co., Pittsburg.
J. H. P. Wharton, Republic Iron & Steel Co., Pittsburg.
W. S. Elliott, Elliott Co., Pittsburg.
W. F. Todd, Somers, Fitler & Todd Co., Pittsburg.
I. J. Andrews, American Sheet & Tin Plate Co., Pittsburg.
J. H. Grubb, Hussey Binns Shovel Co., Pittsburg.
Geo. D. McIlvaine, Frick & Lindsay Co., Pittsburg.
F. A. Ruhlman, Standard Supply Co., Portsmouth, O.
G. M. Pearse, Brown & Sharpe Mfg. Co., Providence.
C. A. Ballou, Brown & Sharpe Mfg. Co., Providence.
Geo. A. Wall, Gardner Governor Co., Quincy, Ill.
Alvin M. Smith, Smith-Courtney Co., Richmond, Va.
J. M. Graham, Glacier Metal Co., Richmond, Va.
E. A. Eichel, Mark Mfg. Co., Richmond, Va.
W. R. Patten, Saginaw Mfg. Co., Saginaw, Mich.
H. C. Woodruff, U. S. Graphite Co., Saginaw, Mich.
Frank B. Godard, U. S. Graphite Co., Saginaw, Mich.
P. F. Dawson, U. S. Graphite Co., Saginaw, Mich.
J. H. Halow, Ga. Supply Co., Savannah, Ga.
F. W. Stover, Ga. Supply Co., Savannah, Ga.
James Biggs, Hardwicke Etter Hardware Co., Sherman, Tex.
W. Parker, Pa. Shafting Co., Spring City, Pa.
Walter C. Ridings, Syracuse Supply Co., Syracuse, N. Y.
John K. Broderick, Broderick & Bascom Rope Co., St. Louis.
Arthur L. Broderick, Broderick & Bascom Rope Co., St. Louis.
L. D. May, A. Leschen & Sons Rope Co., St. Louis.
W. R. Colcord, W. R. Colcord Mchy. Co., St. Louis.
A. Hawley, St. Louis.
A. C. Boughton, St. Louis.
C. A. Bashford, Knight & Wall Co., Tampa, Fla.
W. E. Sanders, Thermond Rubber Co., Trenton, N. J.
Chas. F. Green, Home Rubber Co., Trenton, N. J.
W. G. Berger, Home Rubber Co., Trenton, N. J.
J. L. Fresner, Eagle Glass & Mfg. Co., Wellsburg, W. Va.

W. C. Danser, Danser Mfg. & Supply Co., Weston, W. Va.
J. W. Scott, Industrial Supply Co., Wilmington, Del.
W. H. Mills, Valley Iron Works, McKeesport, Pa.
B. M. Scott, Duncan & Goodell, Worcester, Mass.
C. J. Christensen, Norton Co., Worcester, Mass.
E. W. Dodge, Norton Co., Worcester, Mass.
Geo. C. Montague, Norton Co., Worcester, Mass.
P. J. Thompson, Stambaugh-Thompson Co., Youngstown, O.
B. H. Coe, Stambaugh-Thompson Co., Youngstown, O.
W. R. Goudie, Republic Rubber Co, Youngstown, O.
John W. McGuire, Republic Rubber Co., Youngstown, O.
W. E. Manning, Youngstown Sheet & Tube Co., Youngstown, O.
H. C. Foster, Boston Woven Hose & Rubber Co., Boston.
John G. Isham, National Lead Co., Cincinnati.
Frank J. Oliver, Oliver Bros. Purchasing Co., New York City.
E. H. Refior, Bostwick-Brown Co., Toledo, O.
H. G. Warren, Diamond Rubber Co., Akron, O.
Chas. F. Abbott, J. A. & W. Bird & Co., Boston.
John H. Richards, American Iron & Steel Mfg. Co., Lebanon, Pa.
Frank X. Pund, Republic Iron & Steel Co, Cincinnati.
W. E. Watson, LaBelle Iron Works, Steubenville, O.
Thos. M. Hayden, Peerless Rubber Mfg. Co., New York City.
C. M. Williamson, U. S. Graphite Co., Saginaw, Mich.
G. L. Reeves, Reeves Pulley Co., Columbus, O.
W. A. Bonesteel, The Worden Tool Co., Cleveland, O.
John B. Rhoades, J. E. Rhoades & Sons, Philadelphia.
Chas. E. Brown, J. E. Rhoades & Sons, Philadelphia.
Stanley H. Simpson, J. E. Rhoades & Sons, Chicago.
E. R. Cooledge, Chicago.
W. P. Smith, Mead & Smith, Rogersville, Tenn.
A. R. Smith, Roger Campbell Co., Detroit.
W. W. Campbell, Roger-Campbell Co., Detroit.
N. A. Gladding, E. C. Atkins & Co., Indianapolis.
E. H. Defenbaugh, Chicago.
Jos. P. Summers, Summers-Parrott Hardware Co., Johnson City, Tenn.
Edw. C. Hinman, American Steam Pump Co., Battle Creek, Mich.
L. Werstein, American Steam Pump Co., Battle Creek. Mich.
Chas. M. Spencer, Stockham Pipe & Fittings Co, Birmingham, Ala.
F. I. Gunner, Bielsford & Francis Belting Co., Buffalo.
W. W. Wilson, Bielsford & Francis Belting Co., Buffalo.
G. O. Nevitt, Buffalo Forge Co., Buffalo.
J. L. Gaul, J. A. & W. Bird & Co., Boston.
Geo. F. Swetzer, Boston Belting Co., Boston.
C. F. Beezley Jr., R. R. Donnelley & Sons Co., Chicago.
F. D. Halm, Mark Mfg. Co., Chicago.
J. A. Joseph. Chicago.
Elmer Crawford, Chicago.
Cay C. Cooper, Chicago.
Lewis P. Zimmerman, Iron Trade Review, Cincinnati.
W. H. Gahr, E. A. Kinsey Co., Cincinnati.
W. J. Radcliffe, E. A. Kinsey Co., Cincinnati.
W. H. Hayden, Hayden-Corbett Chain Co., Columbus, O.
L. W. Seymour, Jas. Ohlen & Sons Saw Mfg. Co., Columbus, O.
Henry Bachman, Weinman Pump Mfg. Co., Columbus, O.
W. N. Weinman, Weinman Pump Mfg. Co., Columbus, O.
Fred C. Dreyer. Fred C. Dreyer Supply Co., Cumberland, Md.
I. C. Scoville, Detroit Twist Drill Co., Detroit.
Randell H. Mitchell, Mich. Lubricator Co., Detroit.
Wayne E. Williams, Mich. Lubricator Co., Detroit.
P. L. Barter, McCord Mfg. Co., Detroit.
W. B. Covell, Jewel Belting Co., Hartford, Conn.
Geo. B. Dickerson, N. J. Car Spring & Rubber Co., Jersey City, N. J.
L. C. Cato, E. C. Atkins Co., Memphis, Tenn.
M. W. Mix, Dodge Mfg. Co., Mishawaka, Ind.
J. Edwin Davis, New York Rubber Co., New York City.
Thos. B. Galbreath, Eureka Fire Hose Mfg. Co., New York City.
Jacob Stephan, Wm. H. Haskell Mfg. Co., Pawtucket, R. I.
J. E. Osgood, J. M. Carpenter Tap & Die Co., Pawtucket, R. I.
Chas. H. Cooper, Henry Disston & Sons, Philadelphia.
E. F. Cooper, Henry Disston & Sons, Philadelphia.
F. J. Ford, Ford Chain Block Co., Philadelphia.
E. W. Hough, American Pulley Co., Philadelphia.
S. L. Webster, Delta Tire Works, Philadelphia.
Chas. Bond, Chas. Bond Co., Philadelphia.
A. M. Maddock, Maddock Co., Philadelphia.

Erie Railroad Excluded from Using Water

The Erie Railroad Co., as a result of a circuit court decision handed down on April 8, has been permanently enjoined from taking water from the Cuyahoga river at Kent, O. The injunction will become effective on Dec. 1, 1911. The company uses on an average of 350,000 gallons daily from this stream, in connection with its large shops at Kent. The suit was brought by a number of water power development companies on the ground that the water was supplied to locomotives and not returned to the stream. It is said that Erie officials are considering the locating of the shops elsewhere.

Foremen Banquet.—The Foremen's club of the Park Drop Forge Co. of Cleveland, held its quarterly banquet at the Gillsy hotel on April 8. Thirty-one covers were laid and after the tables were cleared, the guest of the evening, R. R. Abbott, metallurgist and chief engineer of the Peerless Motor Car Co., gave an address on "The Heat Treatment of Steel." The address was illustrated with lantern slides and was very greatly enjoyed. The Park Drop Forge Co. is one of the largest drop forgers of alloy steel, crank shaft, axle and gear work, in the country, and these quarterly banquets are planned to provide a pleasant way of securing scientific information for employes.

Hereafter the Copper Producers' Association will furnish monthly statements of exports of copper to the government for checking purposes, at the government's request. While the government figures and those of the association have checked fairly well, yet some variances have appeared on account of the difference in dates and the methods of reporting.

The Pittsburg Coal Co. has declared the regular quarterly dividend of 1¼ per cent on preferred stock, payable April 25.

MERGER COMMITTEE

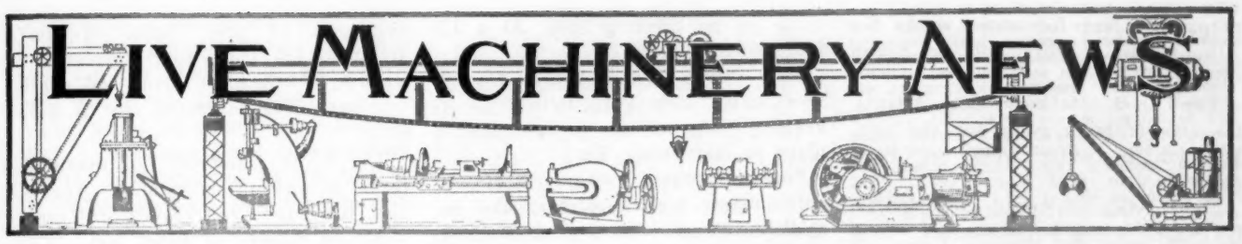
Named For Alabama Consolidated and Southern Steel Combine.

Progress is being made in the proposed merger of the Alabama Consolidated Coal & Iron Co. and the Southern Iron & Steel Co., which is now being negotiated by New York bankers. At the request of security holders of both companies, a committee has been formed to formulate a merger either by direct ownership or by the acquisition of control of both interests by a new company. This committee consists of Cecil A. Grenfell, of Bourke-Schiff & Co., London, representing English holders in the Southern Iron & Steel Co.; Alexander J. Hemphill, vice president of the Guaranty Trust Co., New York; Chas. Hayden, of Hayden, Stone & Co., New York; Benjamin Strong Jr., of the Bankers Trust Co., New York, and Henry H. Melville, of Montreal. The Bankers Trust Co. has been designated as depository. Edwin G. Merrill, John W. Platten and Harry Bronner have been appointed a committee for the protection of the security holders of the Southern Iron & Steel Co., default having been made upon the first and refunding mortgage bonds and the 6 per cent gold debentures. Up to the time of the appointment of the general committee, the proposed consolidation was in the hands of Mr. Grenfell, representing the Southern Iron & Steel Co., President Jos. Hoadley, representing the Alabama Consolidated, and Samuel Untermyer, of New York.

Stout Institute. — Mrs. James H. Stout and surviving heirs of James H. Stout, millionaire lumberman of Menomonee, Wis., have offered as a gift to the state of Wisconsin the entire property of the Stout Institute, one of the largest and most famous industrial and trade schools for boys and girls in the west. It was built by the late Senator Stout at a total investment of $500,000, and was supported by him.

The Wisconsin Bridge & Iron Co., Milwaukee, Wis., has filed a complaint with the interstate commerce commission against the Chicago, Milwaukee & St. Paul Railway Co., alleging an unjust and unreasonable charge on a shipment of structural iron from North Milwaukee to Chicago. The complaint asks that a just and reasonable rate be fixed and the present rate cancelled. This rate, it avers, should be not more than 3 cents per cwt. in carload lots.

LIVE MACHINERY NEWS



In spite of the fact that there is more prospective business in the markets at present than in a number of months, machinery interests continue to suffer from the lack of immediate business. Reports from the leading centers without exception reflect a quiet condition. In New York, the lack of business is partly attributed to the quoting of unsatisfactory prices by bidders. Several new lists have been submitted to the trade; the chief one comprises the machine tools for the Saunders Trade School, Yonkers, N. Y.; two other lists have been distributed by the American representatives of Japanese firms. New York machinery dealers are expecting early action on the list submitted some months ago by the American Bank Note Co. for its New York plant. The Pennsylvania General Electric Co. has announced that it has discontinued consideration of the bids asked for early in the year on its equipment for its Erie, Pa., plant. In Pittsburg, the market is extremely quiet. It is not expected that the Pittsburg Crucible Steel Co. will issue a list for its proposed plant at Midland, Pa., for several months. The Westinghouse Electric & Mfg. Co. has not yet asked bids on the equipment for its proposed foundry at Trafford City, Pa. In Cleveland, the number of inquiries has slightly increased; no new lists have appeared. In Chicago, the Northwestern railroad is in the market for a few tools, and the Union Pacific and the Santa Fe have also issued lists; none of them, however, are extensive.

Railroads

Reports from Fairmont, W. Va., state that the Morgantown & Kingwood Railroad Co. has completed plans for new railroad shops to be built at Sabraton, W. Va., to replace the shops destroyed by fire some time ago.

Foundries

B. J. Robinson, Vicksburg, Miss., is considering the erection of an iron foundry. Plans which have been drawn provide for a brick and steel structure to cost $20,000.

The Washington Iron Works, Seattle Boulevard and Norman street, Seattle, is tearing down its old foundry building and erecting a new reinforced concrete foundry, 120 x 160 feet. Other additions to the plant are contemplated in the near future. The total cost will approximate $200,000.

Machine Tools

Bids will be received by John H. Claxton, secretary of the board of education, Yonkers, N. Y., until May 1, for a part or the whole of the attached list of machinery. All machines must be ready for delivery by June 15. In each case where a certain make of machine is specified, it is understood that dealers may bid on an approved equal of same. There is also a list of specifications out on a considerable amount of power transmission apparatus, for installation at the Saunders school, Yonkers. Included are 19 Dodge hangers of different drops; seven double-branch adjustable hangers, 14-foot drop; 12 pieces compressed, turned steel shafting; 10 solid safety collars, and seven pairs flanged couplings. The same conditions apply to both lists. George Bullock, Robert G. Jackson and James J. Fee comprise the special purchasing committee. The list of machinery follows:

Two 14-inch by 5-inch Lodge & Shipley engine lathes.
Eight 12-inch by 5-inch LeBlond engine lathes.
One 15-inch by 5-foot J. B. Morris engine lathe.
One 15-inch by 6-foot J. B. Morris engine lathe.
One 16-inch by 6-foot LeBlond engine lathe.
One No. 13 Brown & Sharpe universal tool grinding machine.
One 15-inch Potter & Johnston shaper.
One 18-inch Gould & Eberhardt shaper.
One 12-inch Pratt & Whitney precision sensitive drill.
One Niles-Bement-Pond twist drill grinder.
One No. 2A Brown & Sharpe universal milling machine.
One No. 3 LeBlond heavy-duty, universal milling machine.
One 28-inch Snyder drill press.
One 14-inch Pratt & Whitney combined turret chucking lathe and wire feed screw machine.
One No. O, Colburn giant key seater.
One Franklin portable crane.
One Oliver motor driven oilstone grinder.
One 36-inch H. B. Smith band saw.
One No. 14 Oliver hand planer and jointer.
One No. 144-B Oliver hand planer and jointer.
Four 11-inch by 4-foot M. T. lathes, Blount.
One No. H-1 Sturtevant double forge.
One No. 2 multivane exhaust fan, Sturtevant.
One motor blower.
One 14-inch by 5-foot Hendey engine lathe.
One 14-inch by 5-foot Flather engine lathe.
Four Reed engine lathes, 14-inch by 5-foot.

Contract for the machine shop, 80 x 150 feet, to be erected for the Trussed Concrete Steel Co., Youngstown, O., at Crab Creek, O., has been awarded to the Hunter Construction Co., Youngstown, O.

The International Harvester Co. is remodeling the old foundry at its Milwaukee works into a machine shop, 145 x 203 feet, six stories. The building will have a steel frame and will be thoroughly fireproofed. It will require a large quantity of machine tools, electric motors and power transmission machinery. A portion of the machine tools has already been contracted for, but further orders will be necessary to complete the installation.

Water Works

Lewistown, Mont., has decided to rebuild its water system.

Anna, Ill., has voted a bond issue for the construction of water works.

Rockdale, Ill., has decided in favor of erecting a municipal water system.

The Western Land & Irrigation Co., Ely, Nev., is planning a large irrigation project.

The town of Ferris, Cal., is to improve its pumping plant. A. C. Spencer is in charge.

Dothan, Ala., is considering the erection of water works and an electric lighting plant.

The citizens of North Mankato, Minn., have voted bonds for the construction of water works.

Logan, O., is preparing plans for the construction of water works. H. S. Vance is village engineer.

Longmeadow, Mass., is considering the installation of a new engine and pump in its pumping station.

W. J. Hales, city clerk, Morehead City, N. C., will receive bids until April 20 for installing water works.

A bond issue of $25,000 for water works for Dayton, Tenn., is authorized in a bill to be introduced in the legislature.

James L. Tighe, Holyoke, Mass., is

preparing plans for water works for Athol, Mass. Work will be begun this year.

The J. B. McCrary Co., Atlanta, Ga., is preparing plans for the construction of water works at Fairburn, Ga.

Mena, Ark., will spend about $60,000 for water works improvements. John Thompson is chairman of the board of improvements.

Members of the Oil City, Pa., council have approved plans for improvements to the present water pumping plant to cost $18,000.

A bill providing for a bond issue of $25,000 by Obion, Tenn., has been introduced in the state legislature. The proceeds will be used in the construction of water works.

Corning, Cal., will call for bids within a few days for the construction of water works. W. F. Lunning, Red Bluff, Cal., is the engineer.

Sherman, Tex., will make a number of improvements to its water works, including the installation of new pumping engines. P. C. Thurmond is city engineer.

Burns & McDonnell, Kansas City, Mo., are preparing plans for water works for Upton, Wyo. Contracts will probably be let in May. Estimated cost, $20,000.

A large number of pumping plants are to be installed by farmers in the Highley district in Maricopa county, Ariz. The Highley Development Co., of Highley, is interested.

Brady, Tex., has voted $40,000 worth of bonds for the construction of water works. J. B. Hawley, Fort Worth, Tex., is the engineer. A pumping station will be included.

The board of trustees, Pleasanton, Cal., is in the market for a 50-horsepower pump and motor capable of carrying 30,000 gallons of water an hour into the two reservoirs of the town.

Turpin & Eldredge, civil engineers, Rawlings, Wyo., are making surveys for improvements to the water system. The work will include the installation of a pumping station. Bids will be asked about June 1.

New Works

The Jungers Stove & Range Co., Grafton, Wis., will erect three new buildings for the manufacture of stoves and ranges.

The Rue Gas Engine Co., 71 Broadway, New York, will erect a plant for manufacturing gas engines at Bordentown, N. J.

The Davis Threshing Machine Co., Oshkosh, Wis., expects to commence work on an erecting shop, 30 x 120 feet, about May 15.

The Pelton Water Wheel Co., 90 West street, New York, is in the market for equipment for its new eastern plant at Harrisburg, Pa.

Sacks Brothers, manufacturers of automobiles, are considering the establishment of a factory at Melrose, Cal., near San Francisco. The site has already been purchased.

The Odee Gas Engine Co., Beloit, Wis., is preparing for the removal of its works to Memphis, Tenn. An entirely new plant will be erected at Memphis, according to local advices.

The Elliott Machine Co., W. E. Elliott manager, 5 Erie street, Grand Rapids, Mich., is having plans prepared for a new factory building, construction of which will proabably be started this spring.

The Twin City Rapid Transit Co., Willard J. Hield, general manager, Minneapolis, will build a forge shop, two stories, 30 x 60 feet, at Snelling avenue and Pascal street, St. Paul. The building will cost $5,000.

The Fairbanks-Morse Mfg. Co. will build an 80-foot addition to the blacksmithing department of its Eclipse plant, Beloit, Wis. The present shop is 160 x 240 feet. The whole will be re-roofed at the same time the addition is being constructed.

The Spinner Wire Co., Worcester, Mass., contemplates erecting a mill on Webster street to cost about $75,000. The building will be 400 x 80 feet, three stories, and of mill construction. Steam heating, electric lighting and power plants will be installed.

The United States Metal Products Co., 203-205 West Fortieth street, New York City, has plans under way for an addition to its Rapp plant at College Point, L. I., which includes the erection of a shop, 250 x 600 feet. John W. Rapp is president of the company.

Landers, Frary & Clark, Inc., have awarded a contract for the proposed factory building on East Main street, New Britain, Conn., to B. H. Hibbard & Co. The building will be 350 x 50 feet, seven stories, and will cost $75,000. The machinery equipment will cost an additional $35,000.

The Stover Engine Works, East Freeport, Ill., has begun improvements which will cost between $20,000 and $25,000. Two new buildings will be erected and the capacity of the foundry doubled. It is also planned to add materially to the machine shop and new equipment will be purchased.

The directors of the Vaughn Mfg. Co., Jefferson, Wis., have voted to build a new agricultural implement plant to replace the works recently destroyed by fire. Julius Heimerl, architect, 220 Thirty-fourth street, Milwaukee, will prepare plans and specifications. The estimated cost is $35,000.

The D. D. Demarest Co., manufacturer of mining machinery, Angels, Cal., has announced that it will erect a branch factory at Reno, Nev. The company is the successor to the Angels Iron Works and owns machine shops, foundry, etc., at Angels. The main office of the company is at San Francisco.

Power Plant Equipment

A steam heating plant is to be purchased for immediate installation by E. B. Weathers Sr., Elkton, Ky.

The city council, Francis, Okla., has approved plans for the erection of a municipal electric light plant.

Thessalon, Ont., is considering the installation of a new boiler, engine and generator in its lighting plant.

Q. D. Sauls, Tylertown, Miss., who is erecting a sawmill, is in the market for some second-hand power equipment.

An electric power plant to cost $10,000 is to be built by the Schoppenhorst Dry Cleaning Co., Louisville, Ky.

E. W. Moore, treasurer of the Soldiers' Home, Sawtelle, Cal., will receive bids until April 24 for a steam boiler.

The Sebastopol Cannery, Sebastopol, Cal., will add new boilers and other machinery. B. H. Barthold is manager.

Plans have been approved by L. S. Atkins, Center, Tex., for an electric light and power plant to be erected at Alto, Tex.

The Lehigh Coal & Navigation Co., Philadelphia, is taking bids for the erection of a large power house at Wilkesbarre.

W. M. Bostwick Jr., chairman of the board of trustees, Jacksonville, Fla., will receive bids until April 18 for six transformers.

J. W. Bullard, Tacoma, Wash., is preparing plans for the erection of a power plant at Port Orchard, Wash. Estimated cost, $35,000.

The electricity commission, Alameda, Cal., is considering the installation of electric power in the draw bridges which span the estuary in that city.

Two second-hand 150-horsepower tubular boilers are to be purchased by J. J. Blocher, Owensboro, Ky., for installation in the Troy Laundry & Heating Co.'s plant.

Officers of the Jeffersontown, Ky.,

commercial club report that plans have been completed by Louisville men for the erection of an electric light and power plant there.

The board of education, Wheeling, W. Va., is having plans drawn for an electric light plant to be installed at the Wheeling high school to furnish light for the school and library building.

The Chicago, Rock Island & Pacific Railroad Co. is contemplating the erection of a power plant at Cedar Rapids, Ia. J. B. Berry, Chicago, is chief engineer. Estimated cost, $50,000.

The Michigan United Railways, Detroit, is considering plans for the construction of a power plant with capacity of 6,000 kilowatts at some point near Detroit and also a sub-station at Jackson, Mich.

An electric light and power plant is to be installed in the Capitol hotel, Louisville, Ky., plans for an addition to which are being drawn by Fred Erhart, that city. The improvements will cost $20,000.

P. W. Hill, director of public service, Canal Dover, O., is receiving bids for an electric light plant to be erected at Canal Dover, from plans prepared by S. B. Martin, engineer, Penn building, Pittsburg.

Electric light and power equipment will be required for the Henry Watterson hotel, work on which has been begun at Louisville, Ky. The architect for the hotel, which will cost $600,000, is Brinton B. Davis, Louisville.

The International Harvester Co., Harvester building, Chicago, is considering the erection of a power plant in connection with its Weber works. C. A. Hanson, 601 West Eighty-first street, is superintendent of the Weber works.

The Fox River Electric Development Co., Yorkville, Ill., will erect a hydro-electric plant. Bids for four turbo-generators and other equipment will be received about May 1. H. B. Hallett, Aurora, Ill., is consulting engineer.

A. B. Campbell, superintendent of the electric light and water departments, Troy, Ala., will receive bids until April 17 for one stationary steam engine, 400 horsepower, 150 pounds initial pressure; one electric generator, 250 kilo-volt-amperes, 60 cycles, three-phase, 2,300 volts; pump, capacity not less than 500 gallons per minute against 200 pounds working pressure; motor to drive above pump, 60 cycles, three phase.

Miscellaneous

Bids will be received at the office of hte chief quartermaster, Gouverneur's Island, N. Y., or at Fort Totten, N. Y., until May 3, for a heating plant.

Henry C. Allen, city engineer, Syracuse, N. Y., has charge of plans for the proposed vocational high school to be built by that city. A power plant, machine shop, foundry and a wood-working plant will be included.

The Hydro-Electric Mining Co. has been incorporated under the laws of Arizona to take over the French Hill Mining claims in El Dorado county, Cal. The company is to install a considerable amount of machinery in the near future. F. W. Ford, Los Angeles, Cal., is president and general manager.

The Westinghouse Electric & Mfg. Co. has received an order from the British Columbia Electric railroad for two 45-ton locomotives with quadruple equipments of interpole railway motors and automatic unit switch control; also four double equipments of inter-pole motors and control for the Nashville Railway & Light Co.; also an order from the Johnstown Passenger Railway Co., Johnstown, Pa., for five double equipments. Orders for similar equipment have also been received from the Georgia Railway & Electric Co., Atlanta, Ga., Toledo, Bowling Green & Southern Railway Co., Findlay, O., and the Fairmont & Clarksburg Railway Co., Clarksburg, W. Va.

Government News

Track Material.

A call for bids on track material and other supplies will shortly be issued by the Isthmian canal commission, Washington, under schedule No. 628, to be opened by the general purchasing officer, as follows:

1,800 gross tons Bessemer steel rails (alternate bids desired on open-hearth steel); 1,250 gross tons 90-pound steel rails; 31 open-hearth track frogs; 225 track frogs with manganese steel center; 15 rail frogs; 228,000 pounds angle splice bars for 90-pound rails; 120 open-hearth siding switches; 100 manganese siding switches; 200 special switches; 200 switch stands; 140,000 tie plates; 20,000 angle splice bars; 125 pairs rail joints; 180,000 pounds steel track bolts; 15,200 pounds steel track bolts; 750,000 track spikes; 10,000 lock nuts; 300 sheets planished iron; 300 sheets galvanized iron or steel; 10,000 sheets corrugated roofing iron or steel; 30,000 pounds tapped nuts; 125,600 feet wrought iron or steel pipe; 67,000 feet plow steel six-strand hoisting rope; 41,000 pounds galvanized iron wire; 40,000 pounds Babbitt metal; 15,000 foundry pig tin; 10,000 pounds foundry slab zinc; 20,000 pounds pig lead; 200,000 pounds ingot copper; 3,100,000 pourds foundry pig iron; miscellaneous steel angles, channels, cold-rolled steel billets and merchant bar iron or soft steel.

Bids Invited.

Bids will shortly be invited by the bureau of supplies and accounts, navy department, Washington, as follows:

Until April 25: Ten simplex feed pumps for delivery at Brooklyn, schedule 3483; 1,500 steel tubes, Philadelphia, schedule 3476; miscellaneous wood screws, Brooklyn, schedule 3481; miscellaneous machine screws, Brooklyn, schedule 3481; six pipe sets, Brooklyn, schedule 3481; 15 machine sets, Brooklyn, schedule 3481; miscellaneous hand tools, Brooklyn, schedule 3481; 4,000 pounds regulus of antimony, Brooklyn, schedule 3483; 5,080 pounds naval rolled brass, Brooklyn, schedule 3482; 550 pounds copper plate, Brooklyn, schedule 3482; 12,000 pounds billet steel, Brooklyn, schedule 3482; 12,500 pounds galvanized sheet steel, Boston, schedule 3479; 5,780 pounds galvanized sheet steel, Brooklyn, schedule 3482; 800 pounds condenser tube sheets, Brooklyn, schedule 3482; 50,000 pounds zinc boiler plates, Boston, schedule 3482; 6,000 pounds marine riveting cement, Brooklyn, schedule 3480; 1,500 pounds lubricating graphite, Norfolk, schedule 3483; miscellaneous cast iron pipe fittings, Norfolk, schedule 3476; miscellaneous wrought iron pipe fittings, Norfolk, schedule 3476; miscellaneous iron gate valves, Norfolk, schedule 3476; miscellaneous safety valves, Brooklyn, schedule 3483.

Until May 2: One lathe, Portsmouth, schedule 3476; 120-inch lathe crankshaft, Norfolk, schedule 3485.

Until May 16: Eleven forging presses, Puget Sound, schedule 3475.

Navy Supplies.

Bids opened at the bureau of supplies and accounts, navy department, Washington, April 4, were as follows:

CRANE.—One 10-ton, three-motor electric jib crane: Butte Engineering Co., San Francisco, $3,800; Cyclops Iron Works, San Francisco, $3,500; Maine Commercial Co., New York, $4,089; Morgan Engineering Co., Alliance, O., $7,535; Niles-Bement-Pond Co., New York, $4,470; Toledo Bridge & Crane Co., Toledo, $6,400; Whiting Foundry Equipment Co., Harvey, Ill., $3.470; Northern Engineering Works, Detroit, $4,390.

PLATES.—16,000 pounds medium steel hull plate, galvanized: Dunham, Carrington & Hayden, New York, $0.0449; R. H. Gray, San Francisco, $0.07.

STEEL.—6,000 pounds galvanized steel No. 20 U. S.: Baker & Hamilton, San Francisco, $0.0384; R. H. Gray, San Francisco, $0.0495; J. B. Kendall, Washington, $0.0405; Merchant & Evans, Philadelphia, $0.0417; Vermilye & Power, New York, $0.036; Berry & Aiken, Philadelphia, $0.0429.

SHEET STEEL.—10,000 pounds black sheet steel: R. H. Gray, San Francisco, $427.50; J. B. Kendall, Washington, $355.40; Merchant & Evans, Philadelphia, $426.90; Vermilye & Power, New York, $314; Berry & Aikens, Philadelphia, $376.

ASBESTOS. — 8,000 pounds asbestos millboard: Asbestos Mfg. & Supply Co., San Francisco, $369.35; O. A. Danzenbaker, New York, $415; Durham, Carrington & Hayden, $318.72; R. H. Gray, San Francisco, $424.25.

GRINDER AND MIXER.—One sand grinder and mixer, revolving type: Drew Machinery Co., Manchester, N. H., $655; Alfred T. Green, Chester, Pa., $825; Pacific Hardware Co., Seattle, Wash., $824; Wadham Co., New York, $616; Taunton-New Bedford Copper Co., New Bedford, Mass., $450; M. H. Treadwell, Lebanon, Pa., $1,059.

LATHES. — Ten back-geared, screw-cutting engine lathes, bed 10″ x 12″ x 6: Edward J. Etting, New York, $3,993; Alfred T. Green, Chester, Pa., $5,175; Mertz Fuel Oil Co., New York, $3,974; J. W. Paxton Co., Philadelphia, $3,840; Rockwell Furnace Co., New York, $6,085.

OVEN AND FURNACE.—Furnishing and installing core oven and crucible furnace at navy yard, Philadelphia: Mertz Fuel Oil Equipment Co., New York, $1,785; Alfred T. Green, Chester, Pa., $2,000; J. W. Paxton Co., $1,332; Rockwell Furnace Co., $1,800.

AIR FLASKS.—60 air flasks: Bethlehem Steel Co., South Bethlehem, $15,022; Baker Sigsbee & Co., New York, $14,726; Butte Engineering Co., San Francisco, $29,300.

Negotiations for the reorganization of the Southern Car Co., High Point, N. C., are said to have been completed, and that considerable northern capital will be invested. The company proposes to build various kinds of electric cars. The re-organization has been in the hands of J. B. Duke and W. J. Brokaw, of New York.

STEEL BRIDGES

To be Erected in Kentucky—Contracts Awarded.

Louisville, April 11.

Bids will be opened here April 20 by Charles F. Taylor, commissioner of Jefferson county, for the construction of an 800-foot steel bridge over Salt river between Jefferson and Hardin counties. The bridge will have reinforced concrete piers. The estimated cost of the structure is $85,000.

Favorable action will probably be taken by the Louisville general council on franchise ordinances authorizing the Illinois Central to construct two large steel viaducts over Water street and Sixth and Ninth streets.

The Brackett Bridge Co., of Cincinnati, has been awarded a contract for the reconstruction, with steel, of a bridge over Beech Fork in Nelson county. The award was made by the Nelson fiscal court at Bardstown.

Six steel bridges are planned by the Knox fiscal court, and bids wil lbe received soon at Barboursville, Ky., for their erection.

The Louisville & Nashville railroad will construct a steel bridge, with reinforced concrete piers, over Bay's Fork creek, near Scottsville, Ky.

St. Louis Shipments

Receipts and shipments of pig lead and spelter at St. Louis for the last two weeks were as follows:

	Zinc andd Spelter	Pigs of Lead
Receipts:		
For the week ending April 1...	89,070	29,970
For the week ending April 8...	98,060	36,280
Shipments:		
For the week ending April 1...119,970		28,030
For the week ending April 8...	95,280	32,230

New Engines Booked

The Bessemer Gas Engine Co., Grove City, Pa., has booked the following orders during the past month: Two 20-horsepower Bessemer engines for the American Light & Water Co., Chicago, to operate municipal water plant being installed at Grey Bull, Wyo.; a 55-horsepower Bessemer engine for the Kerr Hill Co., Titusville, Pa.; a 35 horsepower Bessemer engine for the Star Milling Co., Buckhannon, W. Va.; a 35-horsepower Bessemer engine for the Allegheny Valley Brick Co., Olean, N. Y.; a 25-horsepower Bessemer engine for Russel Bros., Fredonia, Pa.; two 135-horsepower Bessemer engines for the Mutual Investment Co., Webb City, Mo.; a 35-horsepower Bessemer for the Piqua Granite & Marble Co., Piqua, O.; a 35-horsepower Bessemer for the C. E. Squires Co., Cleveland, O.; a 35-horsepower Bessemer for the Twentieth Century Mfg. Co., Mansfield, O.; a 20-horsepower Bessemer for the Atlas Machine & Tool Works, Cincinnati, O., a 45-horsepower Bessemer for the Lockwood Mfg. Co., Cincinnati, O.; two 50-horsepower Bessemer direct gas engine driven compressors and an 8-horsepower Bessemer electric lighting plant for the Associated Producers Co., of Oklahoma; four Bessemer direct gas engine driven compressors for the Walcott Gas Co., Shinglehouse, Pa.; a 35-horsepower direct driven compressor for the Greensboro Gas Co., Pittsburg, Pa., and two 35-horsepower Bessemer direct gas engine driven compressors for the Laurel Gas & Oil Co., of Oklahoma.

Making Plant Changes

The Link-Belt Co., Nicetown, Philadelphia, is making a number of changes in its plant, due to the elevation of tracks by the Philadelphia & Reading railway, on which company's line the plant is located. The changes to the Link-Belt plant were necessitated by the lowering of the grade of a cross-street. The work is now well under way.

Builds New Works

The Decker Mfg. Co., Keokuk, Ia., manufacturer of hardware specialties, is erecting a new plant, estimated to cost between $20,000 and $25,000. It will be 50 x 140 feet, three stories, of brick and stone and with concrete foundation. The old plant will be vacated to make room for a contemplated hydro-electric development.

The Star Drilling Machine Co., Akron, O., has purchased a tract of 8 acres at Los Angeles, Cal., for the erection of a factory for the manufacture of oil, gas, water well and prospecting machinery. It is reported that the outlay for the plant will be in the neighborhood of $150,000.

The Maysville, Ky., foundry, which has been operating irregularly for some time, has announced indefinite suspension of operations and closed down April 4. Poor business is given as the cause for the suspension.

The Cyclops Iron Works has purchased a site and will erect a reinforced concrete foundry building at San Francisco. The company has acquired a tract, 100 x 165 feet.

Coal Concern Contracts for Conveyor

The Cleveland & Pittsburg Coal Co., as announced by T. E. Rook, manager, has let a contract to the McMyler Interstate Co., Bedford, O., for a conveyor loading and unloading to be erected on a site at East Fifty-fifth street and Euclid avenue. The proposed plant will involve about 85 tons of steel. A contract for 16 reinforced concrete bins to be constructed in connection with the conveyor, has been let to the Pittsburg Engineering & Construction Co. The Cleveland & Pittsburg company intends later to replace its coal wagons by motor trucks.

Under One Management

The organization of the Lorain Metal Products Co., Lorain, O., has been announced. It will include the consolidation of the Stauder foundry, the O'Brien brass works, and B. R. Maddock's pattern shop. The company will not incorporate for the present, but will be placed in charge of B. R. Maddock. The company will have offices at room 24, Lorain block, Lorain, O., and will begin operating under the new organization shortly.

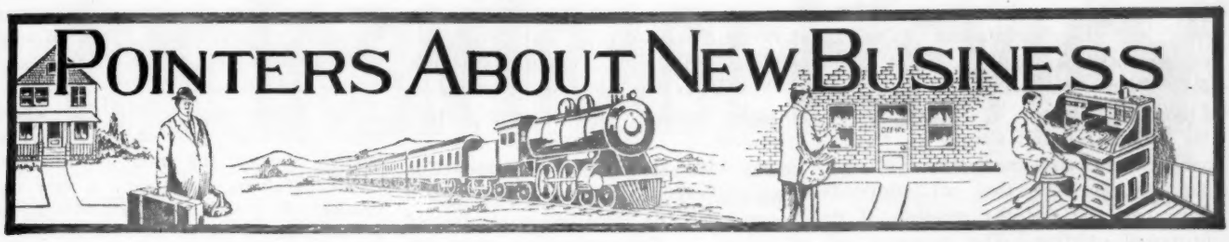
Moving Gradually

The J. J. Vollrath Mfg. Co., Sheboygan, Wis., enameled ware, plumbing and sanitary supplies and devices, will move its enameling warehouse and shipping departments to the new plant on West Michigan avenue by June 1. The remainder of the new plant will not be completed until Jan. 1. The old plant will be dismantled gradually and some of the materials used for new construction.

The U. G. Augustine Foundry & Mfg. Co., has been incorporated with a capital stock of $50,000. The company will erect a plant at Los Angeles, Cal. The directors are U. G. Augustine, James E. Hoyt, James G. Hoyal, Maggie Augustine and Laura M. Augustine.

The Racine Iron & Wire Works, Racine, Wis., is erecting a two-story, brick store house. The new plant, completed about one year ago, is taxed to capacity and additions are contemplated at the end of the year.

H. R. Worthington Co. has declared the regular semi-annual dividend of 3½ per cent on preferred stock, payable May 1.



(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

New Buyers:—

The following manufacturing companies have filed articles of incorporporation:

The Newark Wire Cloth Co., Newark, N. J.; $50,000; by John Campbell Jr., Albert H. Stephens and William J. Davis; wire goods and novelties.

The National Boiler Co., Garwood, N. J.; $150,000; Luke Vincent Lockwood, Arthur J. Albert and Robert L. Redfield; boilers, stoves, furnaces and ranges.

The Tyler Furnace & Mfg. Co., Cleveland; $10,000; by Ludd R. Dunham, Edward W. Tyler, Bertram E. Hamlen, John P. Porltt and Henry J. Probeck.

The Ellwood City Iron & Wire Co., Ellwood City, Pa.; $15,000; Samuel D. Johnston, Daniel A. Brown, Harry M. Whittaker and Arthur D. Pander, Ellwood City, Pa.

The American Steel Mfg. Co.. Jersey City, N. J.; $125,000; by Horace W. Andrews, Edgar Madden and Gussie Cohen; mechanical, electrical and civil engineers. etc.

The Service Motor Car Co., Wabash, Ind.; $500,000; by C. S. Rieman, B. F. Rieman, Ford Rieman, A. E. Bullock, C. E. Cowgill, J. M. Harker and Nelson G. Hunter.

The Finished Parts Mfg. Co., Newark, N. J., $15,000; by James P. Callender, Albert W .Gray and Henry F. Merriam; to manufacture dies, die castings, patterns, etc.

The New York Electric Pneumatic Tool Co., Ridgewood, N. J.; $300,000; by Joseph B. Roberts, Walter W. Wilsey and Leslie D. Forman; foundry. factory and mill supplies.

The Brookside Machine & Repair Co., Cleveland; auto and machinery repair shop; $10,000; by Mike Diebold, Conrad Marquard. Vaclav Vokatz, Charles Vokatz, and S. H. West.

The American Zinc & Acid Co., Jersey City, N. J.; $100,000; by David E. Mitchell, M. T. Kearney, and Leighton H. Campbell; to deal in gold, silver, tin, lead, zinc, copper, iron, etc.

The New York Heater & Supply Co., Jersey City, N. J.; $50,000; by William H. Goff, Norman E. Wiggins and M. C. Duane; mechanical engineer, brass founder, boiler maker, etc.

The Standard Galvanizing & Mfg. Co., Cleveland; treating metals; $15,000; by Samuel G. Catchpole, George T. Bander, Ernest W. Cheeltham, Victoria C. Cheeltham and Charles T. Denby.

The Erie Contracting Co., Buffalo, N. Y.; structural metal work, etc.; sheet iron, copper, tin; deal in metals, etc.; $30,000; by Francis J. Tresise, Edwark C. Schlenker, Jay C. King, all of Buffalo, N. Y.

The Schuylkill Haven Foundry Co., Schuylkill Haven, Pa.; $60,000; by Treasurer Emanuel H. Baker; George H. Michel, Frank Brown, George A. Berger, George M. Paxson, Daniel M. Phillips, George P. W. Saul, Darius H. Coldren, all of Schuylkill Haven, Pa.; William H. Blackton and John J. Fleming, Philadelphia, Pa.; and George Opie, Pottsville, Pa.

New Construction:—

The Pacific Gas & Electric Co. will install a new steam power plant at Sacramento, Cal., soon.

The Empire Plow Co., Cleveland, which recently decreased its capital stock, has abandoned its Ensley, Ala., works. The company is now completing arrangements for the erection of a forge shop addition to its Cleveland plant.

The Hill Pump Valve Co., now located at 557 W. Jackson boulevard, Chicago, will move to 18-20 East Kinzie street, where it will have almost double the amount of space now occupied. It is expected to have the new plant in operation by May 1.

The Standard Oil Co., Cleveland, will immediately commence work on a tin can factory to be located near its No. 1 works, on Broadway, that city. The can plant will consist of two structures, each 70 x 308 feet, and will be in operation the latter part of the summer.

The Flannery Bolt Co., Bridgeville, Pa., has placed an order with the Nazel Engineering & Machine Works, through its Pittsburg representative, J. A. Smitmans, for two 770-pound Beche pneumatic forge hammers to be driven individually by 35-horsepower Crocker-Wheeler motors.

O. Bryant, Sons & Co., Buffalo, general machinists, are completing a two-story factory building, 50 x 150 feet, of brick and concrete construction, at 1407-1411 West avenue, that city. The building will be ready for operating about May 1. The company manufactures special radiator and boiler machinery.

The Jungers Stove & Range Co., of Grafton, Wis., the incorporation of which was noted recently, will erect three buildings for the manufacture of stoves and ranges. The first unit will be two stories, of reinforced concrete, 48 x 140 feet. It will be operated and lighted by electricity. John Jungers is president.

A. P. Witteman Co., Chester, Pa., is making a number of improvements and additions at its forging works, this including the installation of a 250-horsepower Wetherill engine, the completion of the foundations for two large steam hammers; two five-ton electric cranes; an addition to the boiler house, 50 x 50 feet, and the new engine room, 50 x 100 feet, both of brick and steel construction.

Construction work on the new foundry and warehouse buildings of the International Harvester Co., Park street, between Eighth and Fifteenth avenues, having been completed, the company is now ready to proceed with the construction of a large machine shop. The machine shop will have ground dimensions 145 x 203 feet, U-shaped, six stories. The building will be of steel construction throughout, with brick facings.

The Gasoline Rock Drill Co. has applied for articles of incorporation, with a capital stock of $500,000, fully paid up. The company, composed almost exclusively of St. Louis capitalists, intends to build a factory in St. Louis for the manufacture of a rock drill which will be attached directly to the cylinder of a gasoline engine, obviating the use of a steam plant,

air compressor and hose in drilling rock and other substances. The incorporators are Louis L. Scott, John R. Williams, Samuel D. Martin, Louis J. Winkler, Charles C. Tustin, August H. Kohlmeyer and Claude A. Carr.

The Biggs Boiler Works Co., Akron, O., advises that all contracts have been let for the erection of its proposed addition. The structure will be of brick and steel, 120 x 225 feet. A 60-foot bay in the center will be used as an erecting shop; a second bay will be devoted to the machine shop and power plant; while the third bay will be used as a flanging shop. The latter will be equipped with oil furnaces, a hydraulic flanging and dishing press and a hydraulic crane. The power plant equipment will include an engine direct-connected to generator, and a large air compressor. All machinery in the new plant is to be motor driven. The company will also install a full line of heavy hydraulic machinery for handling heavy plate work.

General Industrial:—

Forse Mfg. Co., Anderson, Ind., manufacturing speedometers, has filed notice of capital increase from $20,000 to $50,000.

The American Steel Mfg. Co., Jersey City, with a capital of $125,000, has been incorporated by H. W. Andrews, E. Madden and G. Cohen, New York City.

The Mineral Ridge Mfg. Co., Mineral Ridge, O., manufacturer of coal mining machinery and general castings, has decided to liquidate and will surrender its corporate charter.

The Youngstown Foundry & Machinery Co., Youngstown, O., has received an order for special machinery from the Inland Steel Co., Indiana Harbor, aggregating about $25,000.

The Cleveland Wire Goods Co., Whitney power building, Cleveland, has increased its capital stock from $25,000 to $50,000. This concern is not yet ready to announce its plans.

The Colonial Iron Co., Riddlesburg, Pa., will install in connection with the new blast furnace, complete new stock handling equipment, including skip hoist and bins. Frank C. Roberts & Co., Philadelphia, are the engineers.

The Nordberg Mfg. Co., engines, machinery and power equipment, Milwaukee, has been awarded the contract for furnishing and erecting all power equipment in the new mill of the Lakeside Paper Co. at Neenah, Wis.

Fred W. Craft, Alexander E. Arkin and associates have incorporated the Central Locomotive & Car Works, of Chicago, Ill., with a capital stock of $600,000, for the purpose of engaging in the manufacture of locomotives and cars.

The Bessemer Gas Engine Co., Grove City, Pa., has been awarded a contract by the Honolulu Consolidated Oil Co., of California, for eight 80-horsepower Bessemer gas engine-driven compressors, together with lighting and pumping plant for the Pacific coast works.

The Gawley Foundry & Machine Works, Tacoma, Wash., has been taken over by Peter Westlin, of that city, and will be operated by him as the Westlin Foundry & Machine Works. The plant was opened on April 1 with a force of some 40 men. Marine work will be made a specialty.

The Gregg Co., Ltd., Newburgh, N. Y., manufacturer of railway equipment for sugar plantation service, has completed and put into operation its new works at Hackensack, N. J. The new plant has from three to four times the capacity of the old plant. The general offices have also been moved to Hackensack.

The Carroll-Porter Boiler & Tank Co. has been awarded a contract for about 1,500 tons of riveted steel plate, 9 feet in diameter, to be used in water line construction by the Mt. Hood Railway & Power Co., Portland, Ore. The Carroll-Porter company is preparing for extensive improvements at its works located at Wellsville, O., but details of the proposed improvements have not been outlined.

The Jones & Laughlin Steel Co., Pittsburg, has placed an order with the Alliance Machine Co. for three three-motor electric traveling cranes, one of five tons capacity with a 77-foot span; one of 10 tons capacity, with a 77-foot span, and one of 15 tons capacity with a 122-foot span, for installation in the new billet mill at the Aliquippa, Pa., plant. The Carnegie Steel Co. has placed an order with the same company for a three-motor 10-ton crane with a 54-foot span, to be installed at Homestead, Pa.

The Portage Boat & Engine Co., incorporated at Portage, Wis., recently with a capital stock of $15,000, is formed to take over the partnership business of that name. The company was organized five years ago to build marine engines and motor boats, but will now engage in the automobile trade. The Schulze building adjoining the plant has been leased and is now being equipped. Practically all equipment has been purchased. Herman Zastrow is president; Julius Koepp, vice-president and W. H. Nehls, secretary and treasurer.

The Thomas Grate Bar Co., whose branch plant at Valdosta, Ga., was recently damaged by fire, advises that its Birmingham, Ala., plant is now operating. It proposes to establish works at different points in the United States and Canada for the manufacture of its bars. It has in contemplation the establishment of a plant at Houston, Tex., but is not ready at this time to take up plans for this Texas plant construction.

The Atlas Steel Casting Co., of Buffalo, N. Y., has been incorporated with $100,000 capital stock to operate a plant for the manufacture of steel castings by the acid open-hearth process. George H. Chisholm is president, E. C. Strong vice president and general manager, and Frederick C. Gratwick, Newcomb Carlton and William A. McMahon the other incorporators. The company holds an option on a tract in North Buffalo and as soon as purchase is completed expects to build and equip a modern foundry with steel and concrete buildings, electric power plant, etc.

Trade Note:—

The Orton & Steinbrenner Co., Chicago, announce the appointment of W. Van R. Whitall, Inc., 30 Church street, New York City, as the New York and New England representative for the sale of locomotive cranes and grab buckets which they manufacture.

The Carnegie Steel Co. has leased two floors in the Frick Annex, Pittsburg, and is connecting with Carnegie buildings with the new quarters by two bridges across Relief alley, which separates the two buildings. The additional space will be used by the accounting departments.

The Standard Gage Steel Co., Beaver Falls, Pa., manufacturer of finished crank shafts, connecting rods, finished machine keys, machine racks, etc., has opened branch offices in Chicago and Philadelphia. The Chicago office is located in the Old Colony building, in charge of Mr. Gillen, and the Philadelphia office, located in the Pennsylvania building, is in charge of W. A. Mellon.

Fires:—

The plant of the Camden Iron Works, Camden, N. J., was damaged by fire April 6. A pipe shop was destroyed, entailing a loss estimated at $50,000.